Supporting Information

Conversion of cellulose into valuable chemicals using sulfonated amorphous carbon in 1-ethyl-3-methylimidazolium chloride

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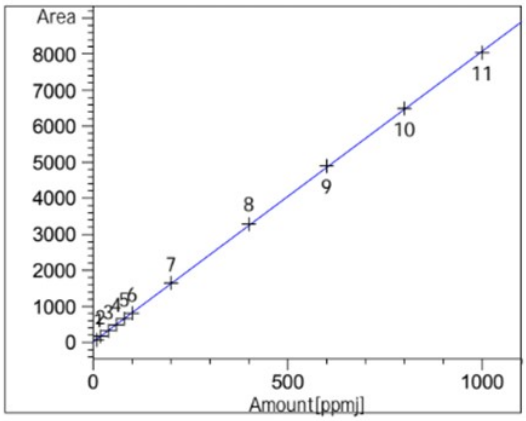
‡ These authors contributed equally to this work.

9.428	1	1	10.00000	75.55061	1.32362e-1	No	No	HMF
		2	20.00000	163.26151	1.22503e-1			
		3	40.00000	316.68356	1.26309e-1			
		4	60.00000	494.78055	1.21266e-1			
		5	80.00000	660.16162	1.21182e-1			
		6	100.00000	806.07642	1.24058e-1			
		7	200.00000	1651.35583	1.21113e-1			
		8	400.00000	3287.28638	1.21681e-1			
		9	600.00000	4902.00635	1.22399e-1			
		10	800.00000	6485.20020	1.23358e-1			
		11	1000.00000	8036.38916	1.24434e-1			



HMF at exp. RT: 9.428
DAD1 A, Sig=210,4 Ref=360,100
Correlation: 0.99995
Residual Std. Dev.: 29.05925
Formula: y = mx + b
m: 8.07940
b: 11.32748
x: Amount[ppmj]
y: Area

Fig. S1 Calibration curve of 5-HMF

8.703	1	1	10.00000	2.87304	3.48063	No	No	Levulinic acid
		2	20.00000	4.90583	4.07678			
		3	40.00000	9.24804	4.32524			
		4	60.00000	15.38773	3.89921			
		5	80.00000	20.71138	3.86261			
		6	100.00000	24.94534	4.00876			
		7	200.00000	57.17052	3.49831			
		8	400.00000	114.74293	3.48605			
		9	600.00000	173.37660	3.46067			
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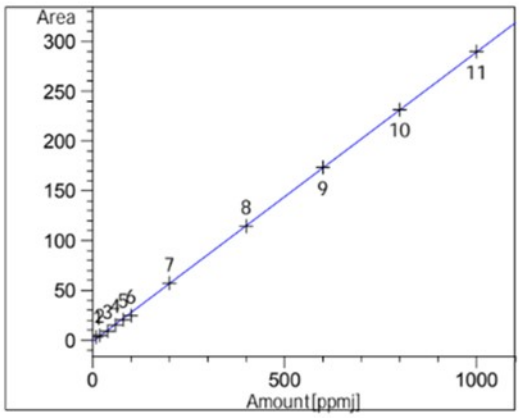

Levulinic acid at exp. RT: 8.703
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Correlation: 0.99994
Residual Std. Dev.: 1.19897
Formula: y = mx + b
m: 2.91265e-1
b: -1.63175
x: Amount[ppmj]
y: Area

Fig. S2 Calibration curve of LA

3.308	1	1	10.00000	5.53259	1.80747	No	No	Formic acid
		2	20.00000	12.16538	1.64401			

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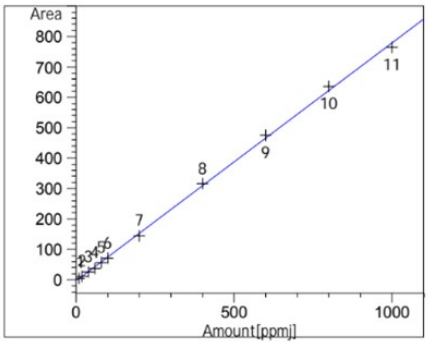
i D:\METHOD\HMF_cot 150_hat nho_KQ.M

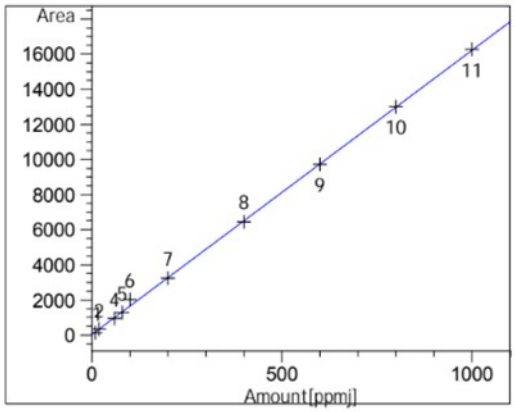
RT	Sig	Lvl	Amount [ppmj]	Area	Rsp.Factor	Ref	ISTD	#	Compound
		3	40.00000	25.88959	1.54502				
		4	60.00000	37.85853	1.58485				
		5	80.00000	56.45914	1.41695				
		6	100.00000	70.78948	1.41264				
		7	200.00000	144.12086	1.38772				
		8	400.00000	316.02692	1.26571				
		9	600.00000	475.57336	1.26163				
		10	800.00000	635.59711	1.25866				
		11	1000.00000	764.11377	1.30871				



Formic acid at exp. RT: 3.308
DAD1 A, Sig=210,4 Ref=360,100
Correlation: 0.99958
Residual Std. Dev.: 8.19957
Formula: y = mx + b
m: 7.84221e-1
b: -4.30366
x: Amount[ppmj]
y: Area

Fig. S3 Calibration curve of FA

10.137	1	1	10.00000	130.14398	7.68380e-2	No	No	DFF
		2	20.00000	322.96695	6.19258e-2			
		4	60.00000	959.88232	6.25077e-2			
		5	80.00000	1282.51855	6.23773e-2			
		6	100.00000	2033.88818	4.91669e-2			
		7	200.00000	3226.26563	6.19912e-2			
		8	400.00000	6462.66455	6.18940e-2			
		9	600.00000	9722.19727	6.17144e-2			
		10	800.00000	1.29986e4	6.15451e-2			
		11	1000.00000	1.62684e4	6.14687e-2			



DFF at exp. RT: 10.137
DAD1 A, Sig=210,4 Ref=360,100
Correlation: 0.99975
Residual Std. Dev.: 134.25755
Formula: y = mx + b
m: 16.20105
b: 39.10210
x: Amount[ppmj]
y: Area

Fig. S4 Calibration curve of DFF

```
11.104 1  1   10.00000   91.20168 1.09647e-1  No  No   Furfural
          2   20.00000  185.23088 1.07973e-1
          3   40.00000  377.13260 1.06063e-1

·DAD 10/28/2021 3:56:22 PM SYSTEM

›d D:\METHOD\HMF_cot 150_hat nho_KQ.M

   RT Sig Lvl  Amount      Area    Rsp.Factor Ref ISTD #   Compou
               [ppmj]
-------|-|--|----------|----------|----------|---|---|-|--------
          4   60.00000  560.21387 1.07102e-1
          5   80.00000  758.74957 1.05437e-1
          6  100.00000  919.84766 1.08714e-1
          7  200.00000 1904.31189 1.05025e-1
          8  400.00000 3790.19458 1.05535e-1
          9  600.00000 5721.13330 1.04874e-1
         10  800.00000 7523.19629 1.06338e-1
         11 1000.00000 9341.49414 1.07049e-1
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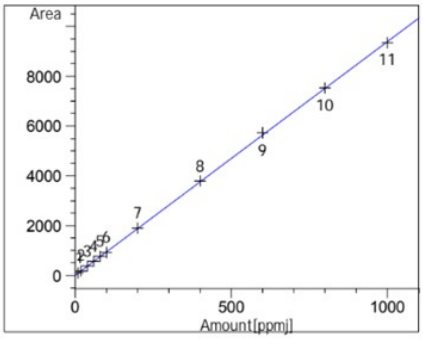


```
Furfural at exp. RT: 11.104
DAD1 A, Sig=210,4 Ref=360,100
Correlation:           0.99995
Residual Std. Dev.:   34.14965
Formula: y = mx + b
      m:      9.39369
      b:      6.63313
      x: Amount[ppmj]
      y: Area
```

Fig. S5 Calibration curve of Fur

```
10.845 1  1   10.00000   51.88923 1.92718e-1  No  No   FDCA
          2   20.00000  104.28742 1.91778e-1
          3   40.00000  205.91724 1.94253e-1
          4   60.00000  311.60834 1.92549e-1
          5   80.00000  414.48544 1.93010e-1
          6  100.00000  518.91388 1.92710e-1
          7  200.00000 1026.62048 1.94814e-1
          8  400.00000 2031.10559 1.96937e-1
          9  600.00000 3018.93579 1.98746e-1
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         11 1000.00000 4947.75244 2.02112e-1
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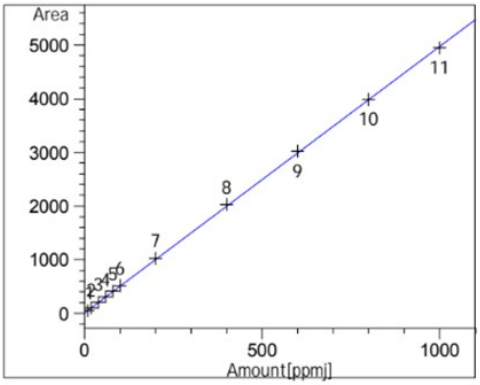


```
FDCA at exp. RT: 10.845
DAD1 A, Sig=210,4 Ref=360,100
Correlation:           0.99995
Residual Std. Dev.:   18.75911
Formula: y = mx + b
      m:      4.96344
      b:     15.86898
      x: Amount[ppmj]
      y: Area
```

Fig. S6 Calibration curve of FDCA

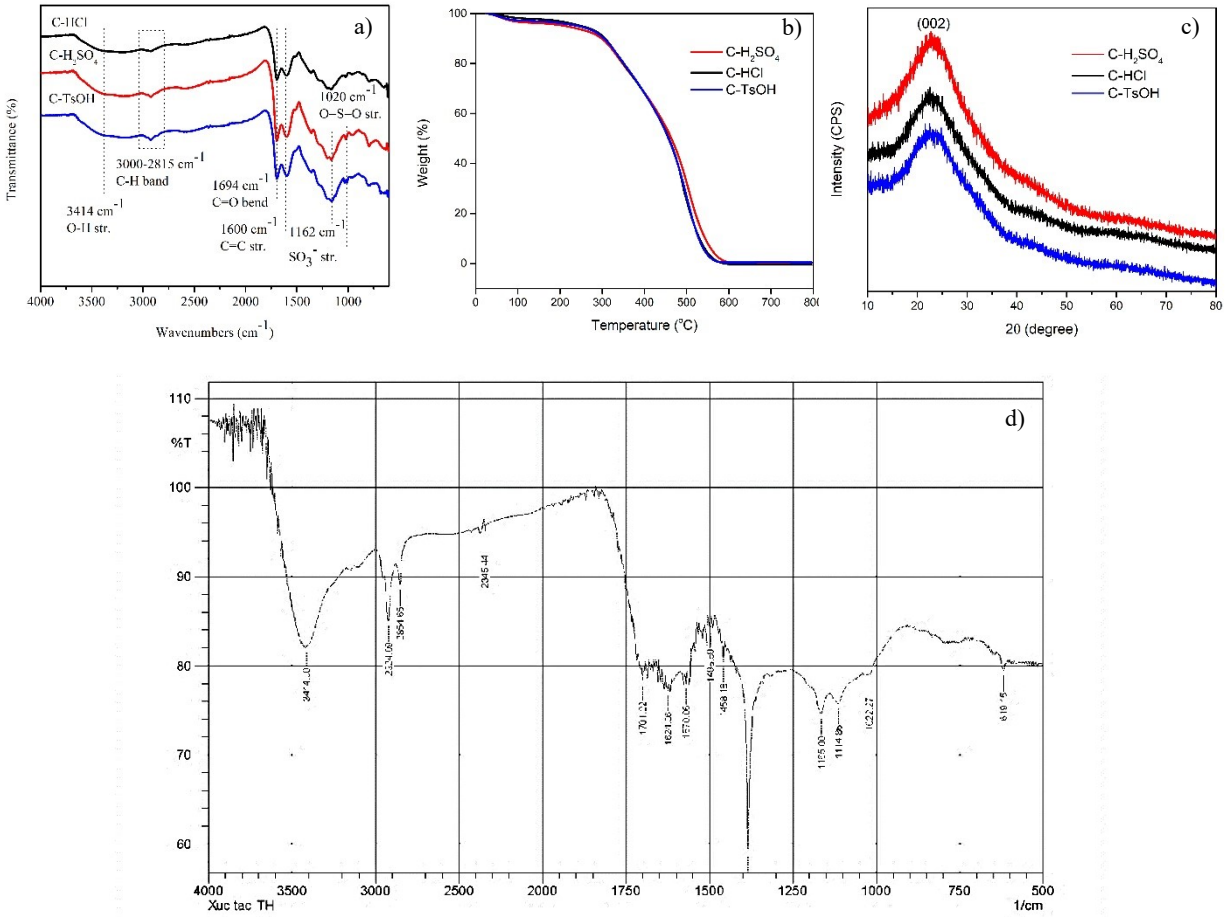

Fig. S7 Characterization of catalysts: a) FT-IR spectrum, b) TGA curve, c) XRD pattern, and d) FT-IR spectra of recovered C-H_2SO_4

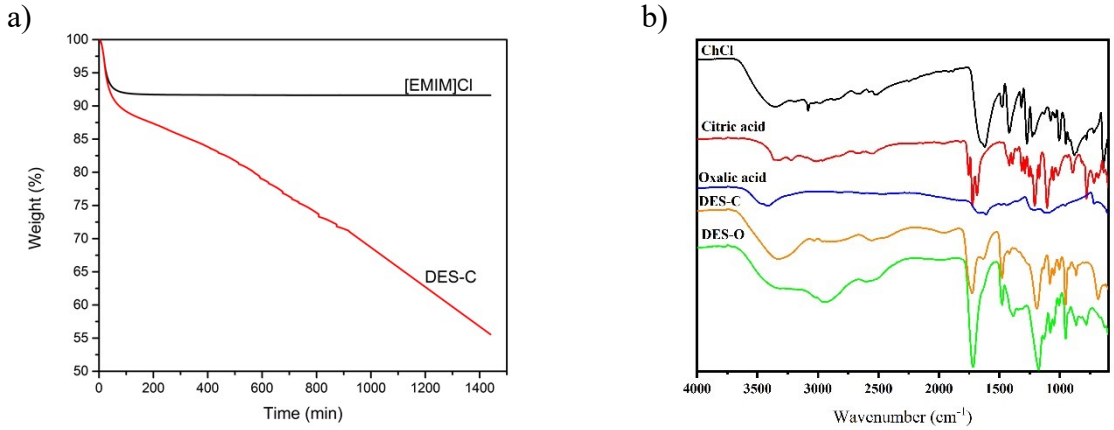

Fig. S8 a) TGA curves of [EMIM]Cl and DES-C at 120 °C and b) FTIR of the original DES-C and DES-O

The HPLC chromatography of HMF, DFF, LA, FA, Fur, and FDCA

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                                               Inj Volume : 10.000 µl
Different Inj Volume from Sample Entry!  Actual Inj Volume : 1.000 µl
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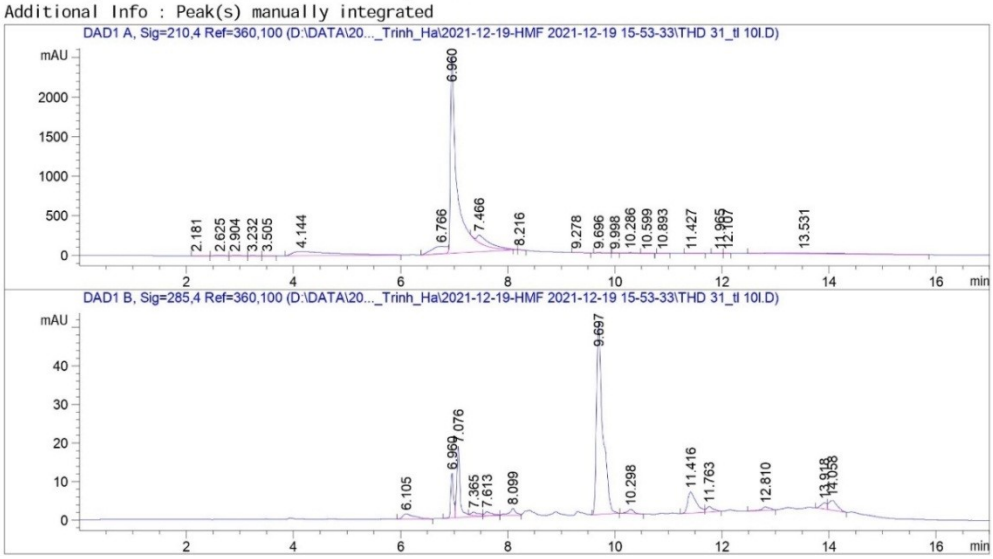


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Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900           -          -          -         Levulinic acid
  9.697 BB      402.17160 8.65844e-3    3.48218    HMF
 10.298 BB        9.46236 4.45163e-2 4.21229e-1    DFF
```


Fig. S9 Reaction conditions: Cellulose (162 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 42.D
Sample Name: THD 42

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                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
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Additional Info : Peak(s) manually integrated
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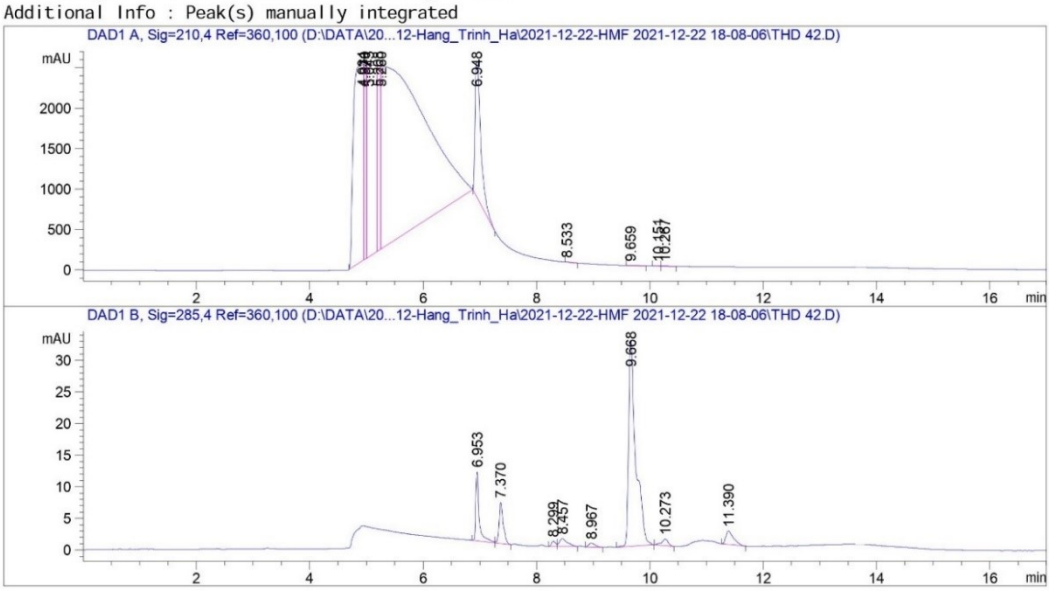


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Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.500		-	-	-		Formic acid
8.900		-	-	-		Levulinic acid
9.659	BB	29.14172	7.56611e-2	2.20490		HMF
10.267	VB	39.44868	5.42278e-4	2.13922e-2		DFF
11.000		-	-	-		FDCA
11.300		-	-	-		Furfural

Fig. S10 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

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Sample Name: THD 33

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                                                 Inj Volume : 10.000 µl
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Additional Info : Peak(s) manually integrated
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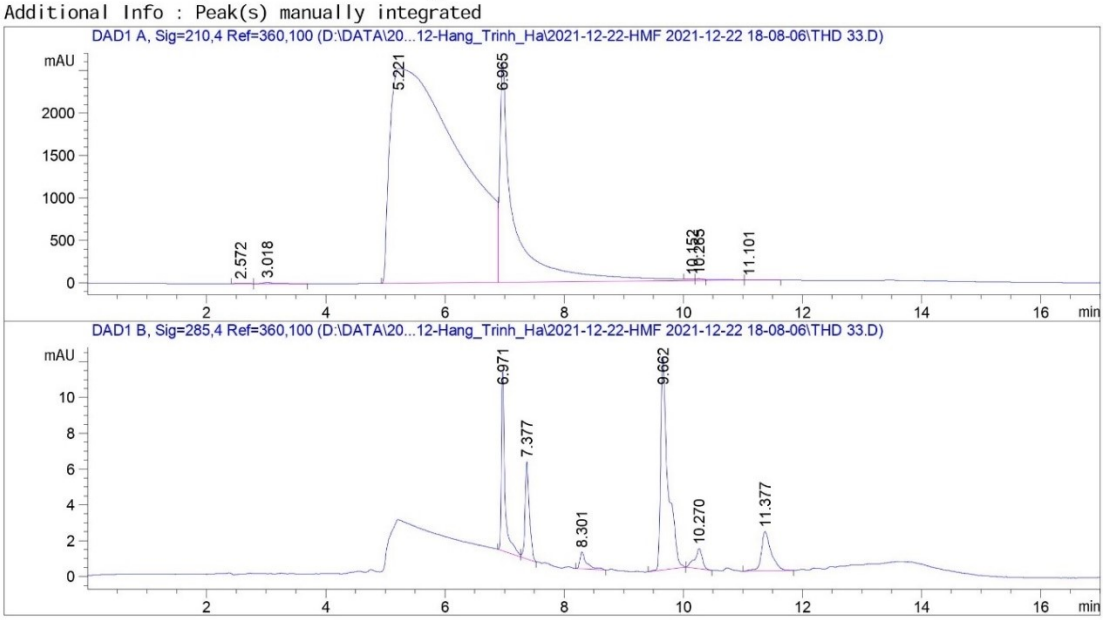


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Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.662	BB	101.44781	5.72090e-3	5.80373e-1		HMF
10.270	BB	10.05096	4.25185e-2	4.27351e-1		DFF

Fig. S11 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

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Sample Name: THD 38

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                                              Inj Volume : 10.000 µl
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Additional Info : Peak(s) manually integrated
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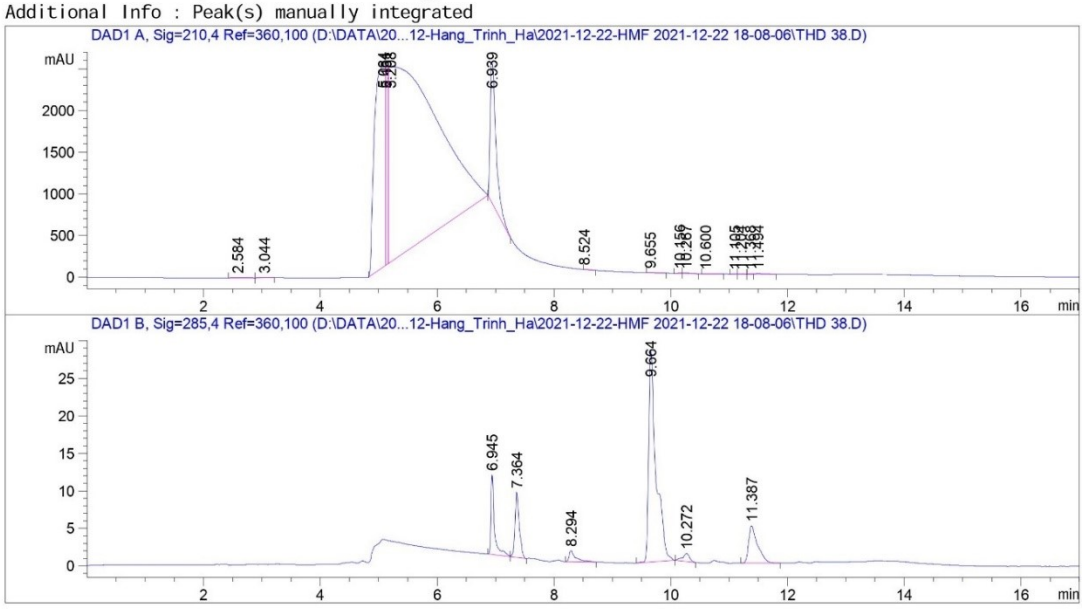


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Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area     Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900           -          -          -         Levulinic acid
  9.664 BB      246.81752 8.03470e-3    1.98310    HMF
 10.272 BB        8.79326 4.71121e-2 4.14269e-1    DFF
```


Fig. S12 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 43.D
Sample Name: THD 43

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Injection Date  : 12/23/2021 2:36:00 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
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Additional Info : Peak(s) manually integrated
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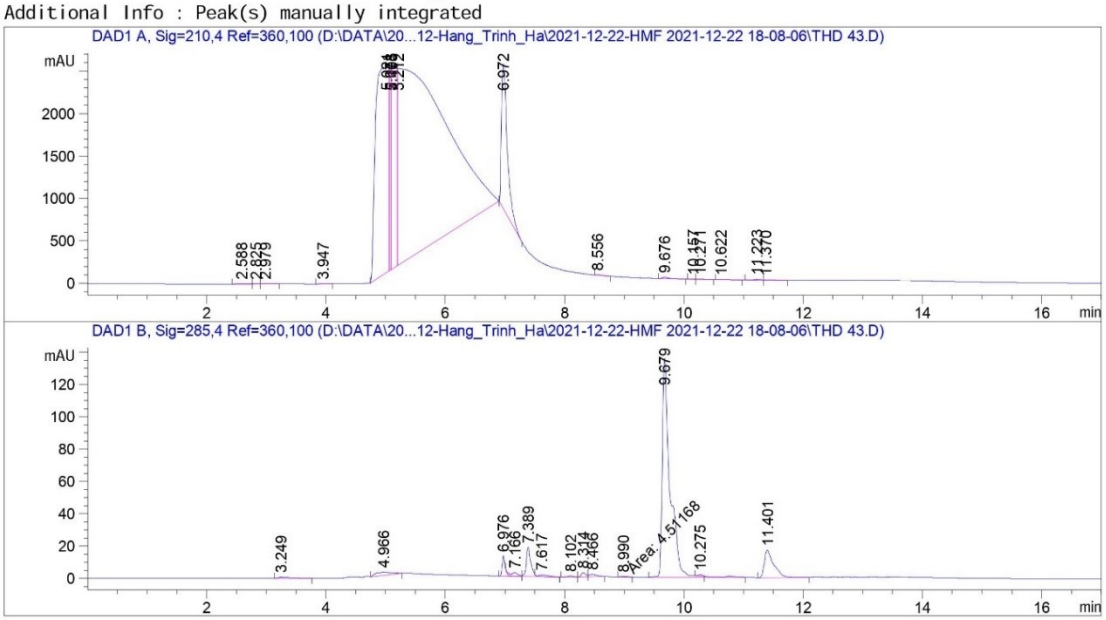


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Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.990 MM        4.51168   21.37944   96.45719    Levulinic acid
  9.679 BV R   1224.64502 9.32398e-3   11.41856    HMF
 10.275 VV E      3.41352 1.04968e-1 3.58310e-1    DFF
```


Fig. S13 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 53.D
Sample Name: THD 53

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                                                 Inj Volume : 10.000 µl
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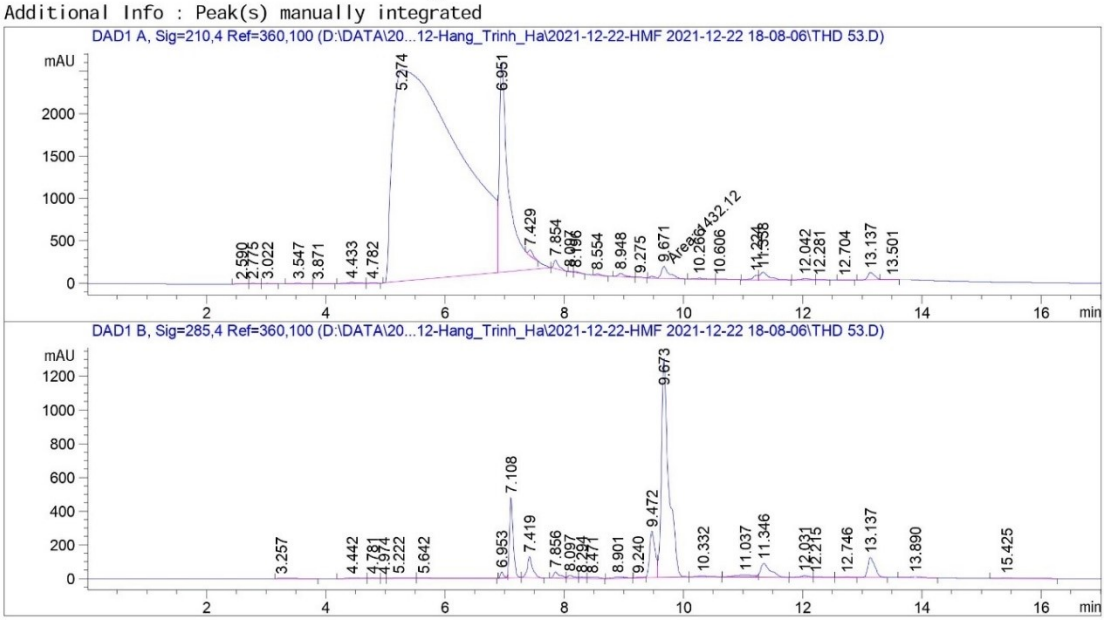


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Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
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RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.547	BB	56.87122	1.37165	78.00723		Formic acid
8.948	BB	314.83707	3.45110	1086.53394		Levulinic acid
9.671	MM	1432.12354	1.22793e-1	175.85410		HMF
10.266	BV	134.95773	4.38406e-2	5.91663		DFF
11.224	BV	320.09885	1.91485e-1	61.29417		FDCA
11.338	VB	918.29266	1.05686e-1	97.05022		Furfural

Fig. S14 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 48.D
Sample Name: THD 48

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Injection Date  : 12/23/2021 4:06:28 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/24/2021 12:53:59 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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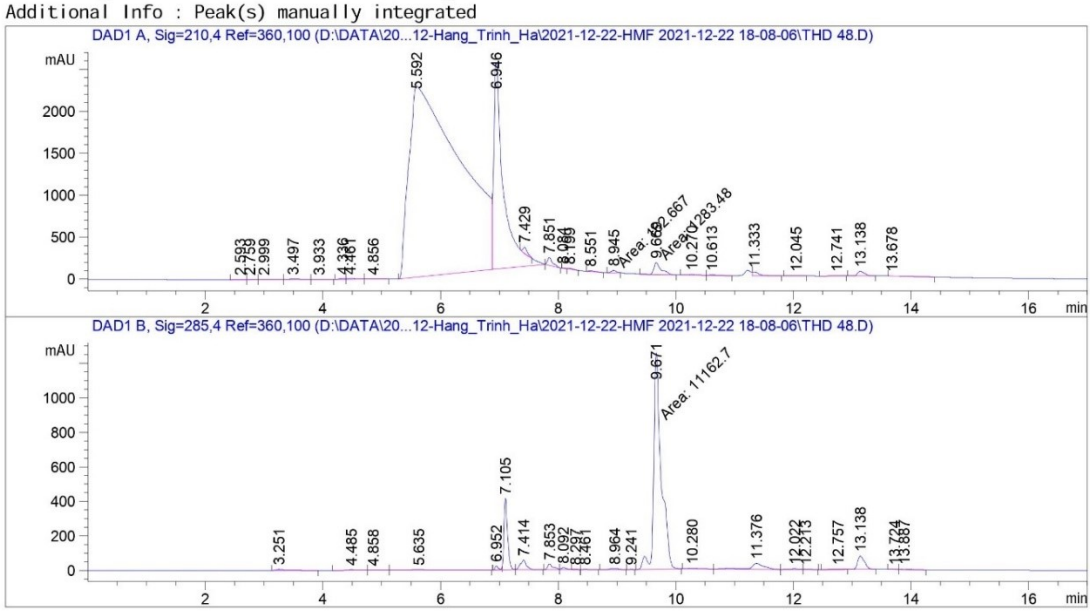


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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/24/2021 12:50:07 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.933	BB	28.39203	1.46844	41.69195		Formic acid
8.945	MM	162.66745	3.46775	564.08925		Levulinic acid
9.669	MM	1283.47937	1.22679e-1	157.45618		HMF
10.270	BV	105.92078	3.89380e-2	4.12434		DFF
11.000		-	-	-		FDCA
11.333	VB	386.09171	1.04626e-1	40.39506		Furfural

Fig. S15 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 34.D
Sample Name: THD 34

```
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Acq. Operator   : SYSTEM                        Seq. Line :  20
Acq. Instrument : HPLC-DAD                      Location :   P1-B-04
Injection Date  : 12/22/2021 11:53:15 PM             Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/25/2021 8:13:44 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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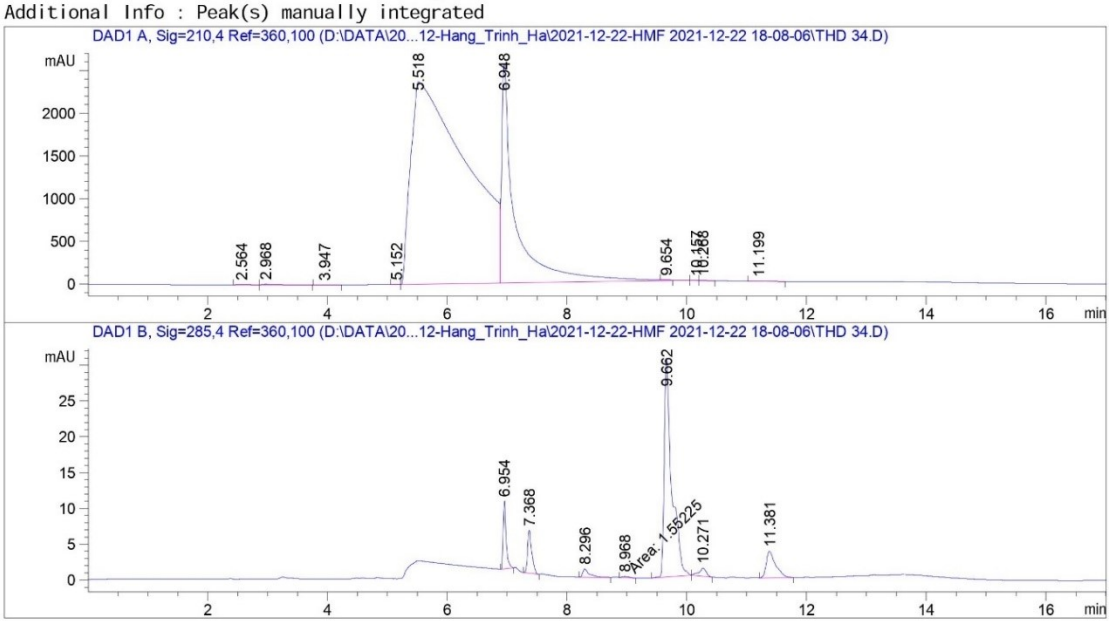


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==================================================================
                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/24/2021 12:31:15 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.968 MM        1.55225   26.37124   40.93476    Levulinic acid
  9.662 BB      265.79782 8.15000e-3    2.16625    HMF
 10.271 BB        9.38301 4.48048e-2 4.20403e-1    DFF
```


Fig. S16 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 44.D
Sample Name: THD 44

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  30
Acq. Instrument : HPLC-DAD                      Location :  P1-C-05
Injection Date  : 12/23/2021 2:54:07 AM              Inj :  1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/25/2021 7:56:56 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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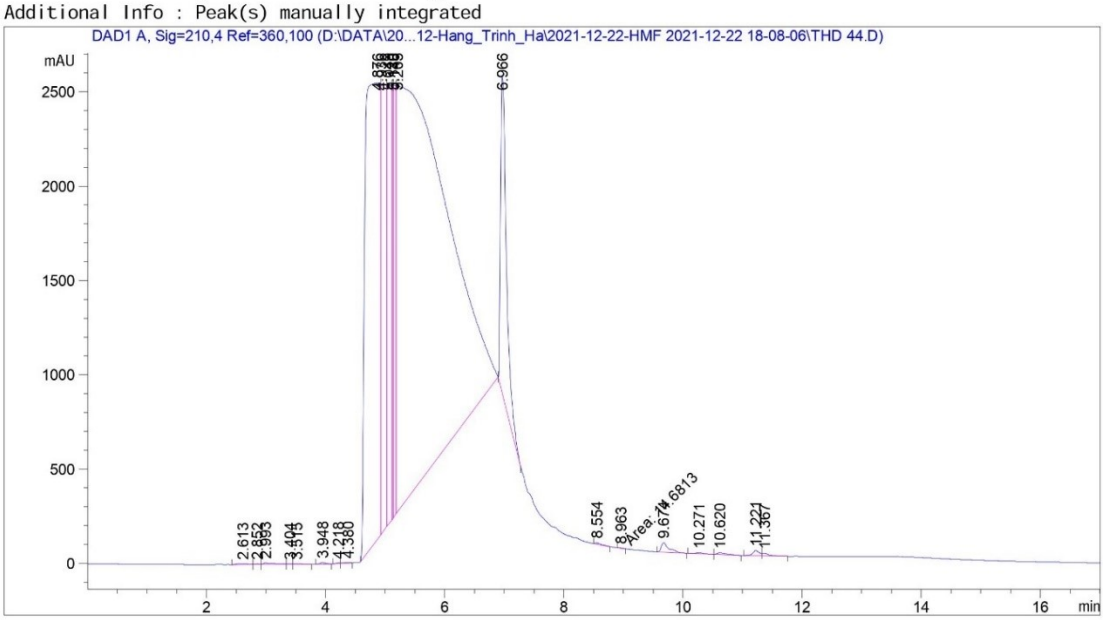


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==================================================================
                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/24/2021 12:50:07 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```
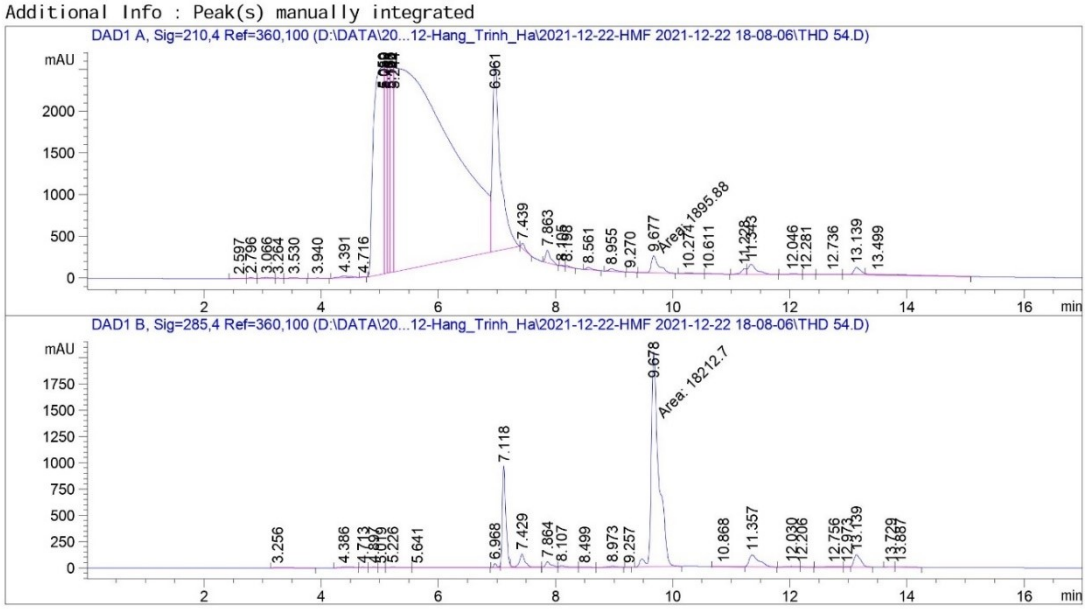

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.948	BB	55.71623	1.37365	76.53443		Formic acid
8.963	MM	14.68128	3.81490	56.00760		Levulinic acid
9.674	BB	442.31339	1.20602e-1	53.34378		HMF
10.271	BV	47.69740	1.11230e-2	5.30540e-1		DFF
11.221	BV	216.30983	1.86693e-1	40.38347		FDCA
11.367	VB	109.97086	1.00033e-1	11.00076		Furfural

Fig. S17 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 54.D
Sample Name: THD 54

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  40
Acq. Instrument : HPLC-DAD                       Location :   P1-D-06
Injection Date  : 12/23/2021 5:55:08 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/24/2021 12:53:59 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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======================================================================
                    External Standard Report
======================================================================

Sorted By             :      Signal
Calib. Data Modified  :      12/24/2021 12:50:07 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

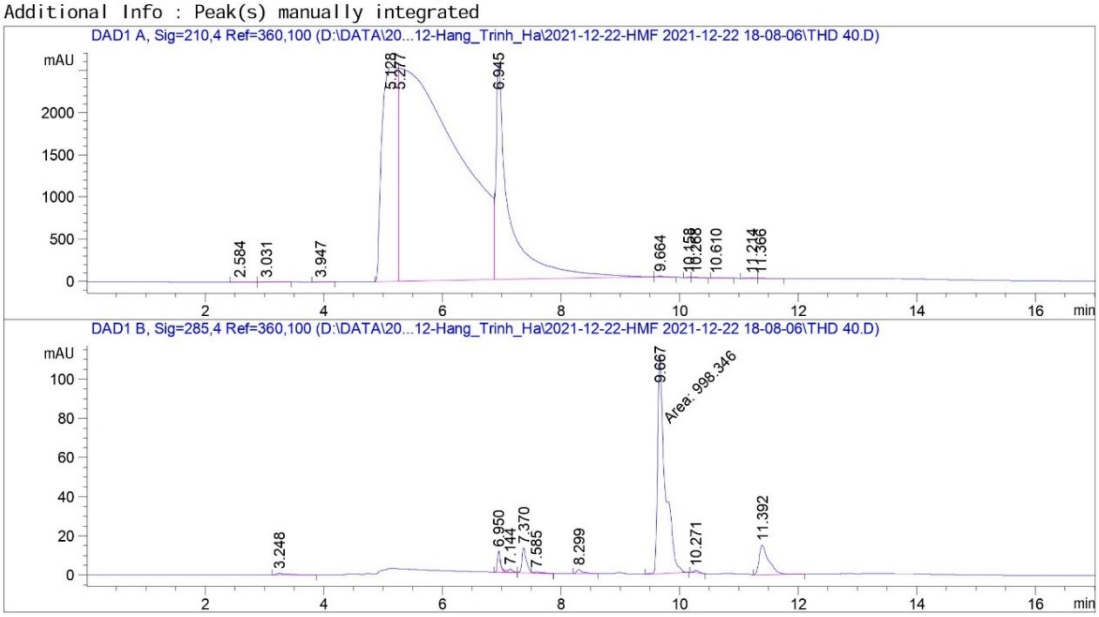
Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.940	BB	49.03071	1.38708	68.00939		Formic acid
8.955	BB	251.40234	3.45559	868.74319		Levulinic acid
9.677	MM	1895.88464	1.23032e-1	233.25452		HMF
10.274	BV	120.45092	4.16867e-2	5.02121		DFF
11.228	BV	374.92627	1.92946e-1	72.34043		FDCA
11.343	VB	1244.90039	1.05887e-1	131.81907		Furfural

Fig. S18 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 40.D
Sample Name: THD 40

Acq. Operator	: SYSTEM	Seq. Line	: 26
Acq. Instrument	: HPLC-DAD	Location	: P1-C-01
Injection Date	: 12/23/2021 1:41:42 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/25/2021 8:32:10 AM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/24/2021 12:31:15 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

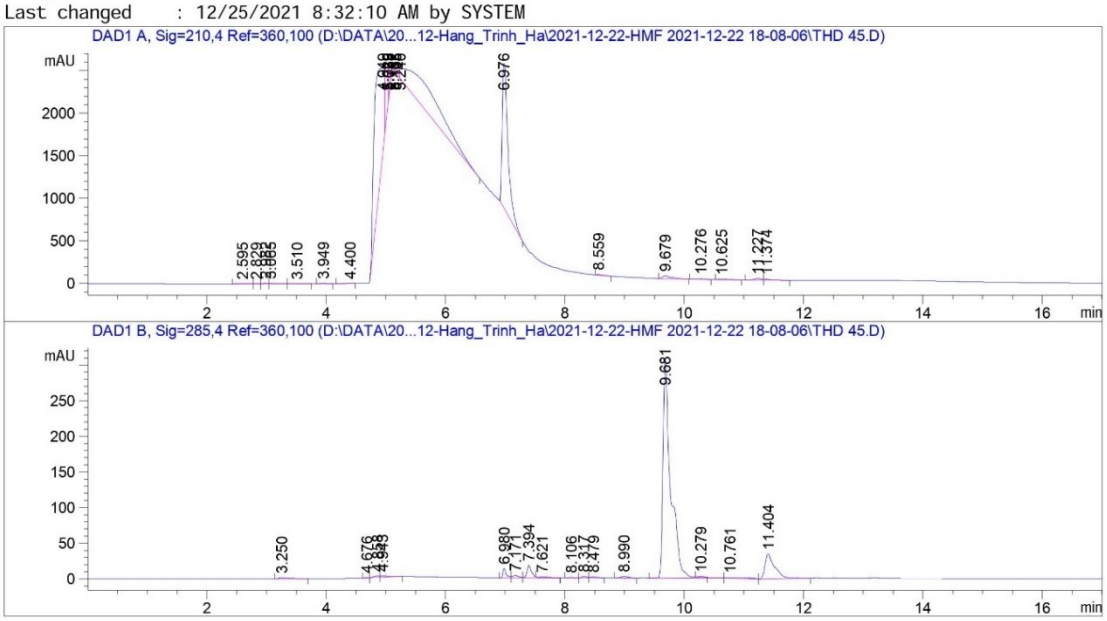
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.667	MM	998.34619	9.25021e-3	9.23491		HMF
10.271	BB	7.48978	5.35010e-2	4.00710e-1		DFF
11.097		-	-	-		FDCA

Fig. S19 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 45.D
Sample Name: THD 45

Acq. Operator	: SYSTEM	Seq. Line	: 31
Acq. Instrument	: HPLC-DAD	Location	: P1-C-06
Injection Date	: 12/23/2021 3:12:12 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/25/2021 8:32:10 AM by SYSTEM		



External Standard Report

Sorted By	:	Signal
Calib. Data Modified	:	12/24/2021 12:31:15 PM
Multiplier	:	1.0000
Dilution	:	1.0000

Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

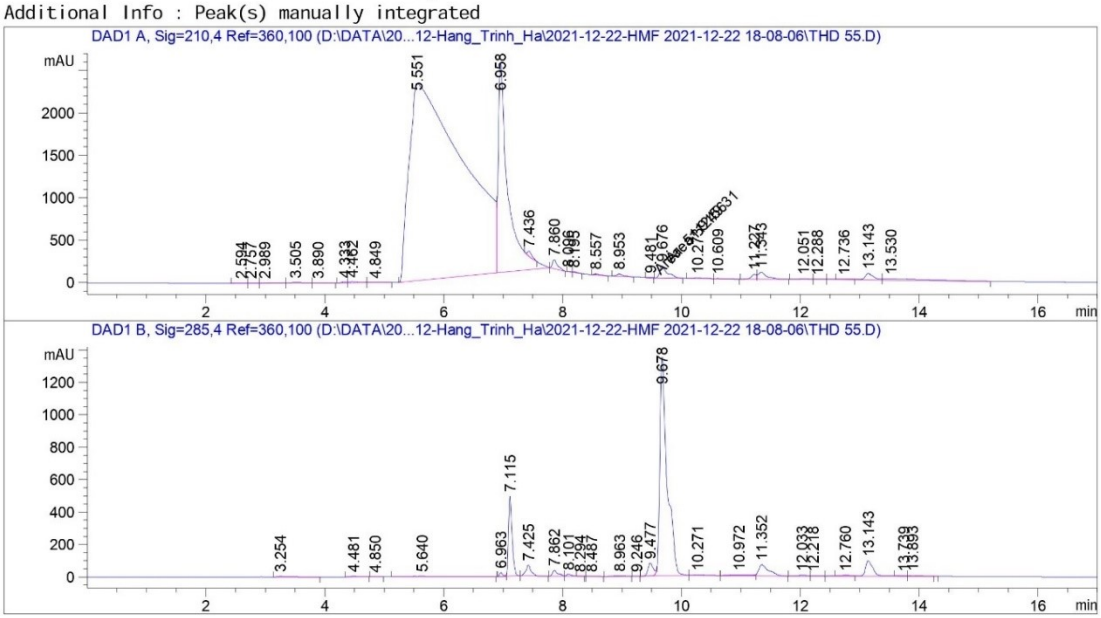
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.990	BB	18.83726	19.38829	365.22223		Levulinic acid
9.681	BV R	2771.14087	9.50559e-3	26.34133		HMF
10.279	VB E	7.83917	5.15801e-2	4.04345e-1		DFF
11.097		-	-	-		FDCA
11.404	BB	393.99500	9.58128e-3	3.77498		Furfural

Fig. S20 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 55.D
Sample Name: THD 55

Acq. Operator	: SYSTEM	Seq. Line	: 41
Acq. Instrument	: HPLC-DAD	Location	: P1-D-07
Injection Date	: 12/23/2021 6:13:12 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_KQ.M		
Last changed	: 2/16/2022 7:16:27 AM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 2/16/2022 7:15:21 AM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

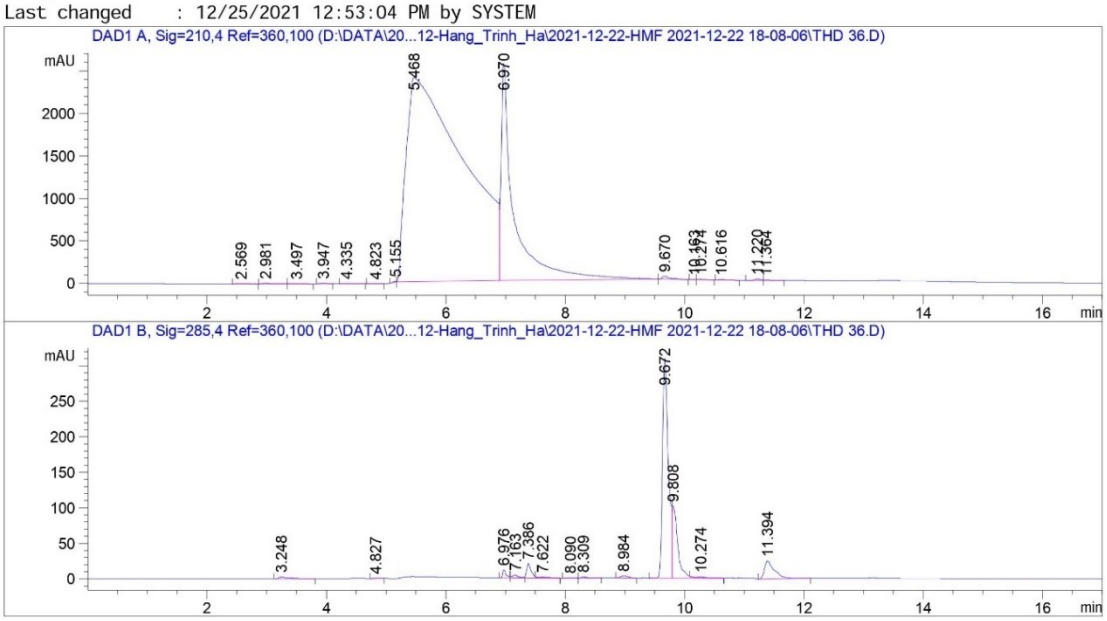
Signal 1: DAD1 A, Sig=210,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.600		-	-	-		Formic acid
8.953	BB	234.29135	3.45722	809.99594		Levulinic acid
9.676	MM	1249.30554	1.22649e-1	153.22644		HMF
10.273	BV	114.16457	4.05834e-2	4.63318		DFF
11.227	BV	349.16763	1.92317e-1	67.15076		FDCA
11.343	VB	826.29462	1.05600e-1	87.25662		Furfural

Fig. S21 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 36.D
Sample Name: THD 36

Acq. Operator	: SYSTEM	Seq. Line	: 22
Acq. Instrument	: HPLC-DAD	Location	: P1-B-06
Injection Date	: 12/23/2021 12:29:27 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_KQ.M		
Last changed	: 12/25/2021 12:53:04 PM by SYSTEM		



External Standard Report

Sorted By	: Signal
Calib. Data Modified	: 12/25/2021 8:45:54 AM
Multiplier	: 1.0000
Dilution	: 1.0000

Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.497	VB	26.98970	1.47848	39.90377		Formic acid
8.900		-	-	-		Levulinic acid
9.670	BB	298.25464	1.19071e-1	35.51341		HMF
10.274	VB	37.11110	0.00000	0.00000		DFF
11.220	BV	114.08005	1.73448e-1	19.78690		FDCA
11.364	VB	64.50709	9.55080e-2	6.16094		Furfural
Totals :				101.36502		

Fig. S22 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 56.D
Sample Name: THD 56

```
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Acq. Operator   : SYSTEM                          Seq. Line :  42
Acq. Instrument : HPLC-DAD                       Location :   P1-D-08
Injection Date  : 12/23/2021 6:31:18 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/25/2021 12:53:04 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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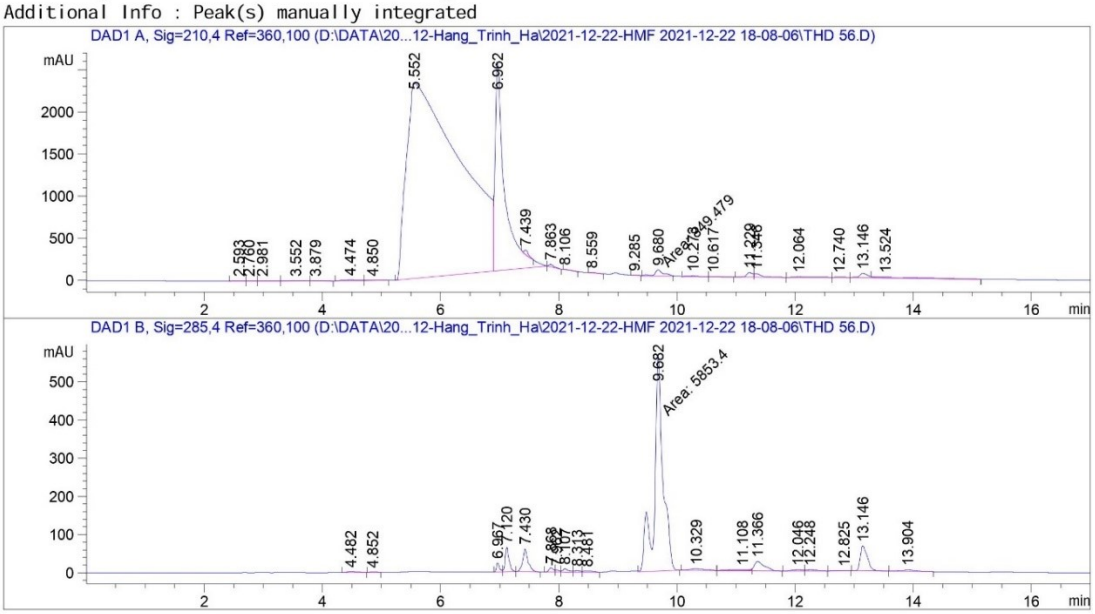


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======================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/25/2021 8:45:54 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.552	VB	64.69894	1.35997	87.98875		Formic acid
8.900		-	-	-		Levulinic acid
9.680	MM	849.47888	1.22121e-1	103.73928		HMF
10.273	BV	94.66292	3.62281e-2	3.42946		DFF
11.229	BV	412.05844	1.93714e-1	79.82157		FDCA
11.346	VB	369.62128	1.04544e-1	38.64171		Furfural

Fig. S23 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 51.D
Sample Name: THD 51

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  37
Acq. Instrument : HPLC-DAD                      Location :   P1-D-03
Injection Date  : 12/23/2021 5:00:41 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/25/2021 8:42:31 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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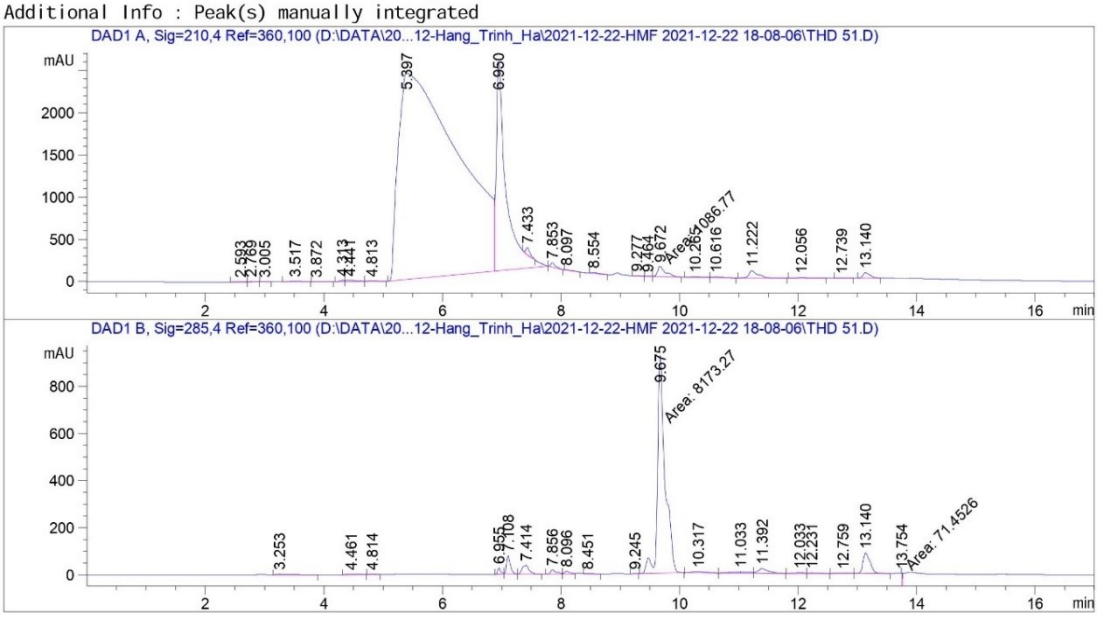


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/25/2021 8:45:54 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                 [ppm]
-------|------|----------|----------|----------|--|------------------
  3.517 BB      106.36711    1.32674  141.12197    Formic acid
  8.900           -            -          -        Levulinic acid
  9.672 MM     1086.77441 1.22481e-1  133.10971    HMF
 10.265 BV      112.71876 4.03122e-2    4.54394    DFF
 11.000           -            -          -        FDCA
 11.222 BB      937.82098 1.05702e-1   99.12910    Furfural
```


Fig. S24 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 41.D
Sample Name: THD 41

```
==========================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  27
Acq. Instrument : HPLC-DAD                        Location :   P1-C-02
Injection Date  : 12/23/2021 1:59:48 AM                Inj :   1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/25/2021 12:53:04 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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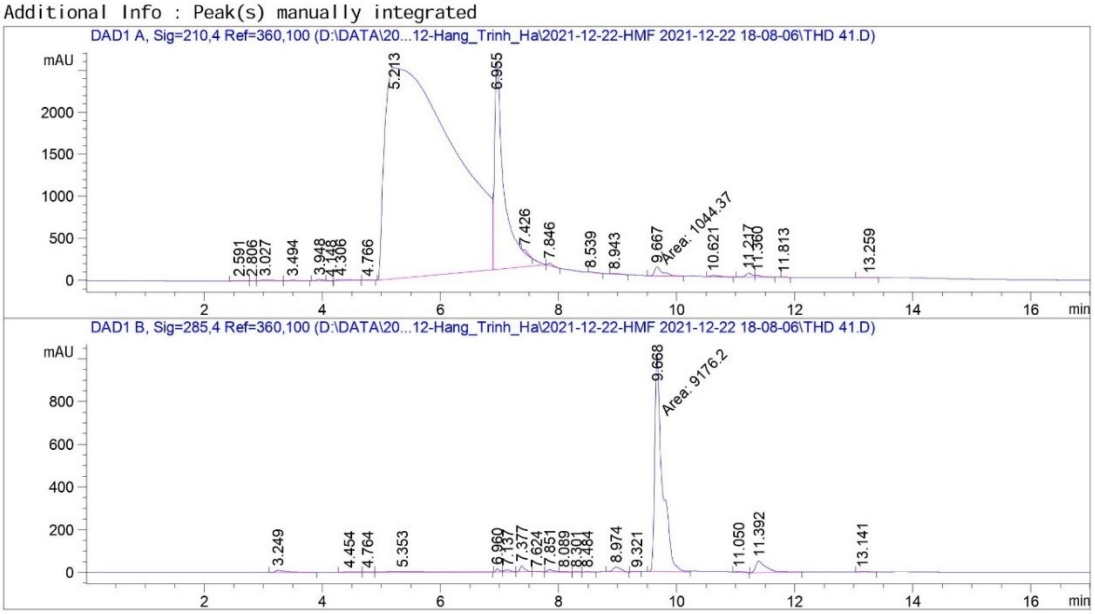


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/25/2021 8:45:54 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

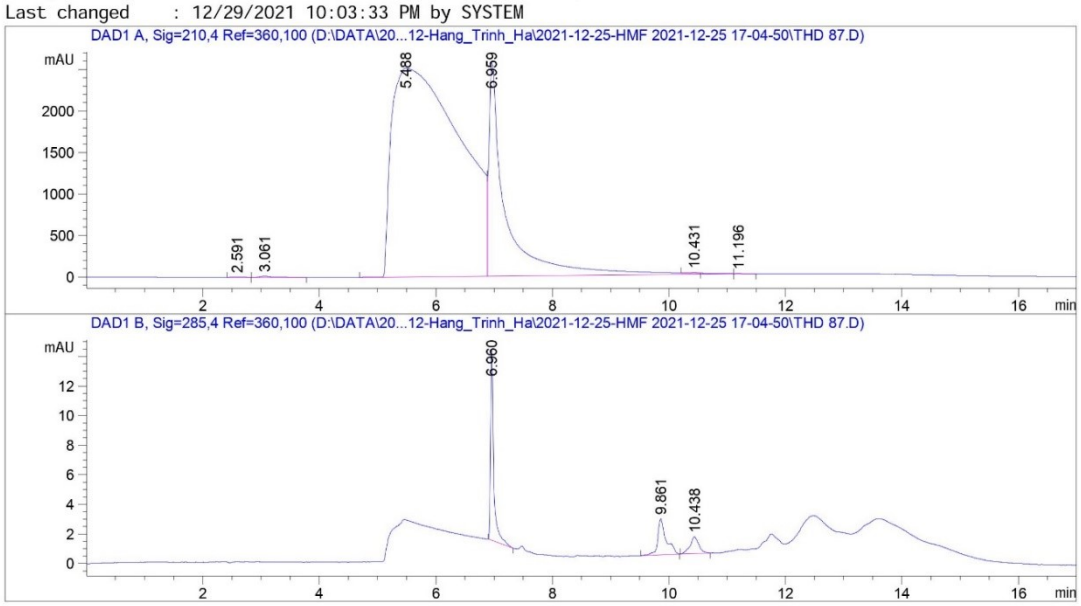
Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.494	VB	78.44407	1.34511	105.51587		Formic acid
8.943	BB	67.60327	3.51617	237.70493		Levulinic acid
9.667	MM	1044.37085	1.22429e-1	127.86136		HMF
10.621	VB	180.04453	4.83191e-2	8.69958		DFF
11.217	BV	363.77826	1.92684e-1	70.09441		FDCA
11.360	VB	168.61162	1.02267e-1	17.24333		Furfural

Fig. S25 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 87.D
Sample Name: THD 87

Acq. Operator	: SYSTEM	Seq. Line	: 47
Acq. Instrument	: HPLC-DAD	Location	: P1-E-04
Injection Date	: 12/26/2021 6:57:47 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.861	BB	23.90809	0.00000	0.00000		HMF
10.438	BB	11.50393	3.84621e-2	4.42465e-1		DFF
11.097		-	-	-		FDCA
11.400		-	-	-		Furfural

Fig. S26 Reaction conditions: Cellulose (162 mg), C-TsOH (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 92.D
Sample Name: THD 92

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Acq. Operator   : SYSTEM                        Seq. Line :  52
Acq. Instrument : HPLC-DAD                      Location :   P1-E-09
Injection Date  : 12/26/2021 8:28:08 AM              Inj :   1
                                                Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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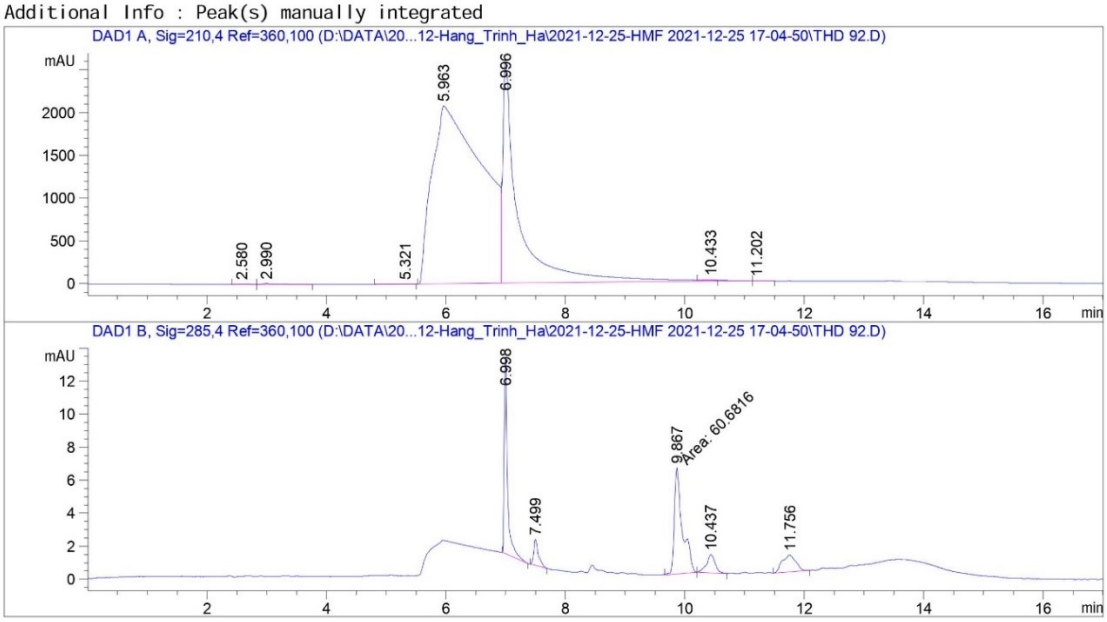


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.867	MM	60.68159	3.08170e-3	1.87003e-1		HMF
10.437	BB	10.91633	3.99725e-2	4.36353e-1		DFF
11.097		-	-	-		FDCA

Fig. S27 Reaction conditions: Cellulose (162 mg), C-TsOH (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 97.D
Sample Name: THD 97

```
==================================================================
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Acq. Instrument : HPLC-DAD                      Location :   P1-F-05
Injection Date  : 12/26/2021 9:58:53 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

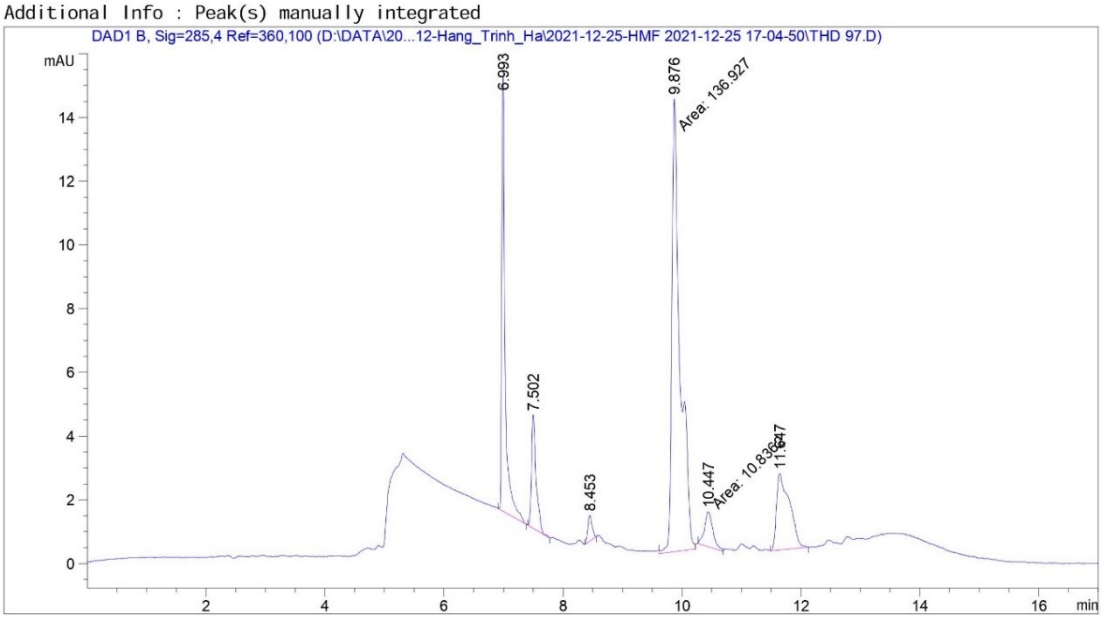


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==================================================================
                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```

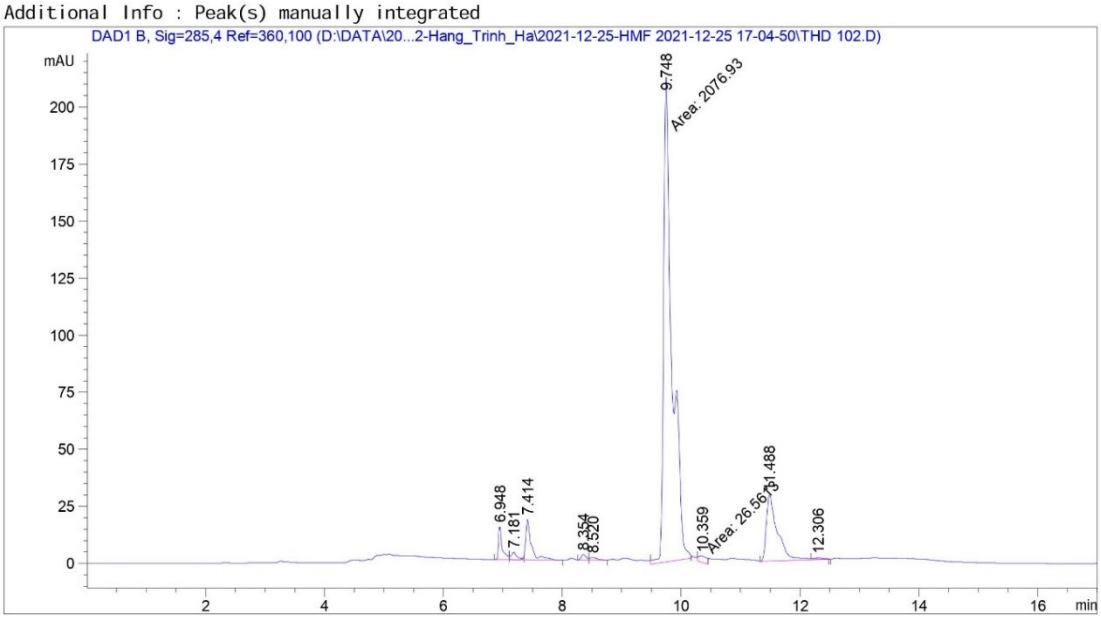
RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.876	MM	136.92741	6.73882e-3	9.22730e-1		HMF
10.447	MM	10.83617	4.01912e-2	4.35519e-1		DFF
11.097		-	-	-		FDCA
11.647	BB	36.39560	3.34988e-3	1.21921e-1		Furfural

Totals : 1.48017

Fig. S28 Reaction conditions: Cellulose (162 mg), C-TsOH (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20...12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 102.D
Sample Name: THD 102

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  62
Acq. Instrument : HPLC-DAD                      Location :   P1-A-08
Injection Date  : 12/26/2021 11:29:11 AM             Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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==================================================================
                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```
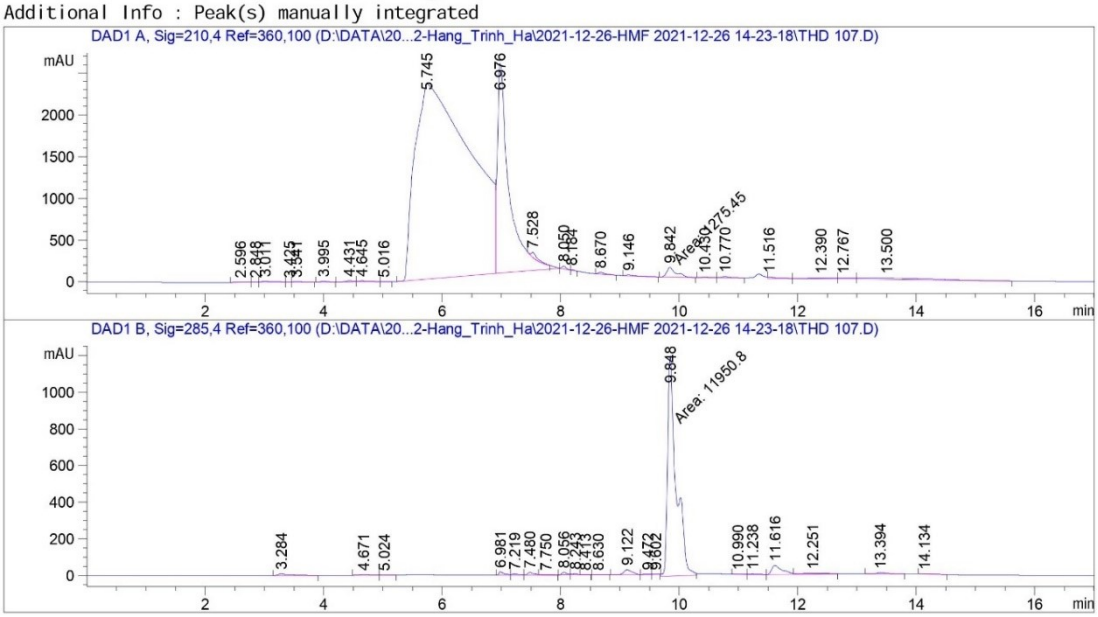

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.748	MM	2076.93140	9.45752e-3	19.64262		HMF
10.359	MM	26.56129	2.25550e-2	5.99090e-1		DFF
11.097		-	-	-		FDCA
11.488	BV R	376.81680	9.55237e-3	3.59949		Furfural
Totals :				23.84120		

Fig. S29 Reaction conditions: Cellulose (162 mg), C-TsOH (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 12 h

Data File D:\DATA\20...12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 107.D
Sample Name: THD 107

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  19
Acq. Instrument : HPLC-DAD                       Location :   P1-B-06
Injection Date  : 12/26/2021 7:48:47 PM               Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 4:11:12 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```

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======================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 4:10:46 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.995	BB	85.10044	1.33964	114.00375		Formic acid
9.146	BB	94.69553	3.49247	330.72093		Levulinic acid
9.842	MM	1275.44580	1.22672e-1	156.46186		HMF
10.430	BV	48.10609	1.15529e-2	5.55765e-1		DFF
11.400		-	-	-		FDCA
11.516	VB	132.96542	1.01144e-1	13.44864		Furfural

Fig. S30 Reaction conditions: Cellulose (162 mg), C-TsOH (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20... 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56\THD 112.D
Sample Name: THD 112

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  15
Acq. Instrument : HPLC-DAD                       Location :  P1-B-02
Injection Date  : 1/2/2022 2:49:58 PM                Inj :  1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56
                  \HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 1/15/2022 9:22:34 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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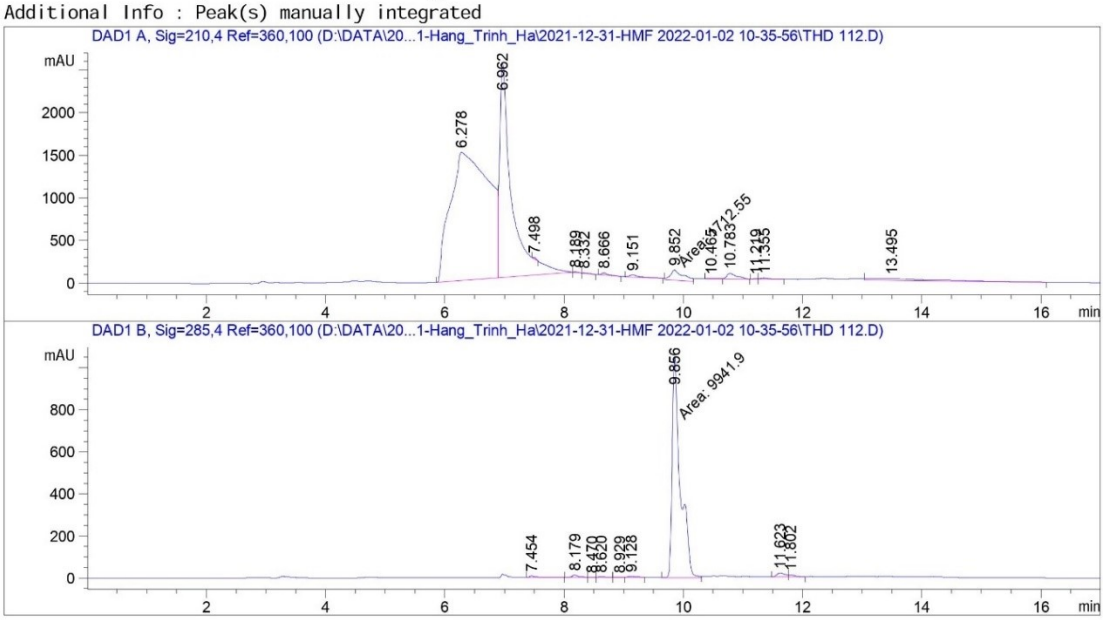


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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      1/15/2022 9:37:22 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.600		-	-	-		Formic acid
8.900		-	-	-		Levulinic acid
9.852	MM	1712.55139	1.22953e-1	210.56308		HMF
10.465	BV E	23.97352	0.00000	0.00000		DFF
11.219	BV	26.89837	8.02028e-2	2.15733		Furfural
11.355	VB	143.57739	1.79205e-1	25.72983		FDCA

Fig. S31 Reaction conditions: Cellulose (162 mg), C-TsOH (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 88.D
Sample Name: THD 88

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  48
Acq. Instrument : HPLC-DAD                       Location :   P1-E-05
Injection Date  : 12/26/2021 7:15:51 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/30/2021 3:25:52 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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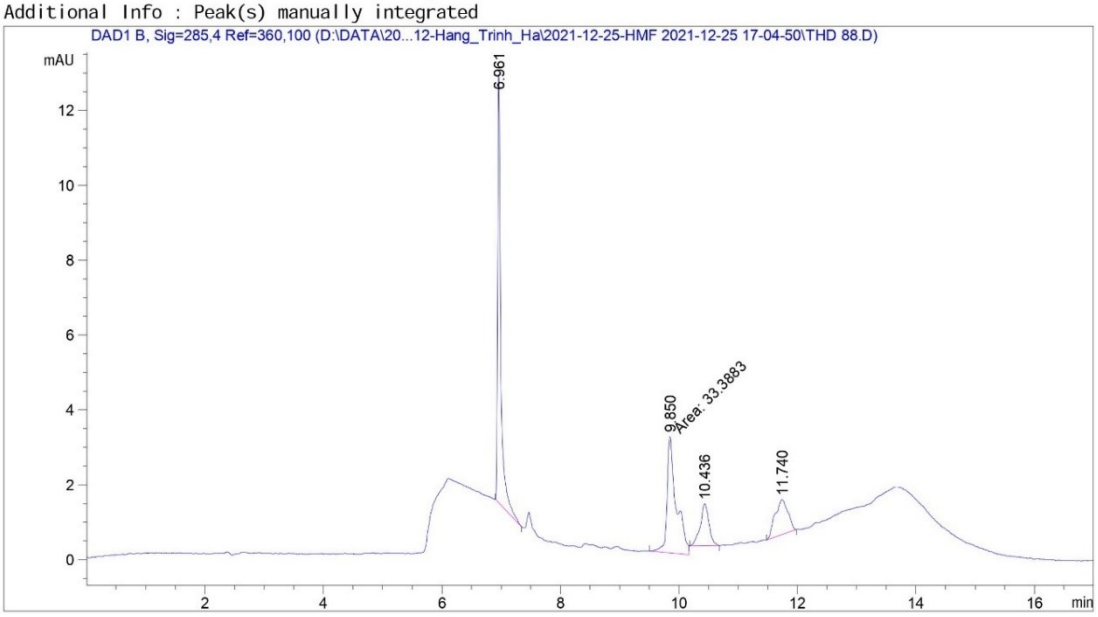


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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 3:26:25 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

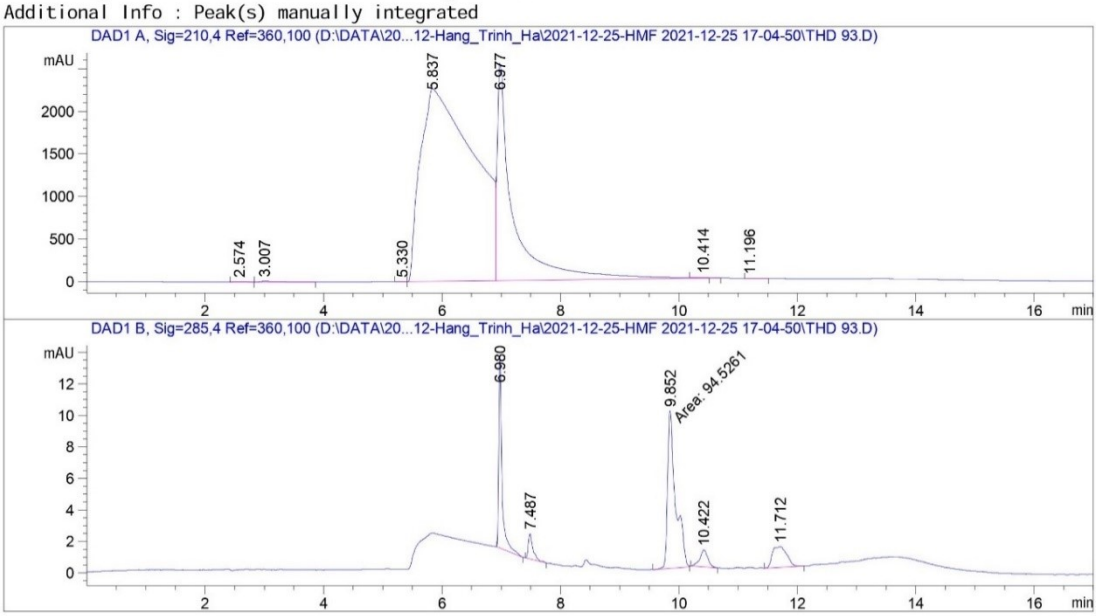
Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.850	MM	33.38832	0.00000	0.00000		HMF
10.436	BB	11.39798	3.87229e-2	4.41363e-1		DFF
11.097		-	-	-		FDCA
11.400		-	-	-		Furfural

Fig. S32 Reaction conditions: Cellulose (162 mg), C-TsOH (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 93.D
Sample Name: THD 93

Acq. Operator	: SYSTEM	Seq. Line	: 53
Acq. Instrument	: HPLC-DAD	Location	: P1-F-01
Injection Date	: 12/26/2021 8:46:15 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.852	MM	94.52610	5.43323e-3	5.13582e-1		HMF
10.422	BB	10.36549	4.15439e-2	4.30623e-1		DFF
11.097		-	-	-		FDCA

Fig. S33 Reaction conditions: Cellulose (162 mg), C-TsOH (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 98.D
Sample Name: THD 98

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  58
Acq. Instrument : HPLC-DAD                       Location :   P1-F-06
Injection Date  : 12/26/2021 10:16:57 AM              Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/29/2021 10:49:23 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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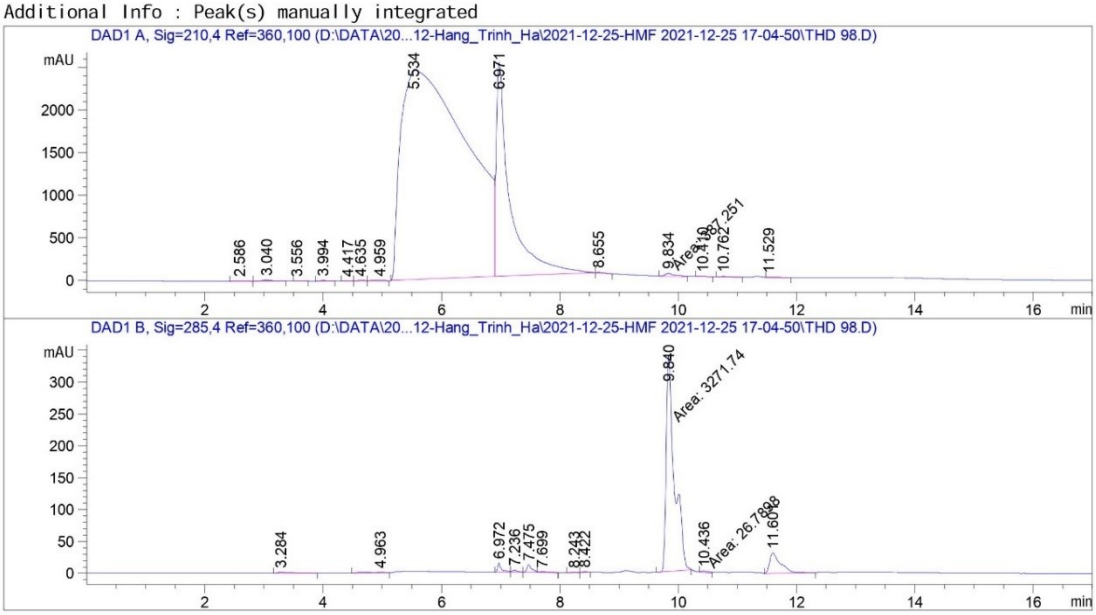


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======================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:46:14 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.994	BB	52.82903	1.37903	72.85281		Formic acid
8.900		-	-	-		Levulinic acid
9.834	MM	387.25150	1.20151e-1	46.52869		HMF
10.410	BB	34.90281	0.00000	0.00000		DFF
11.400		-	-	-		FDCA
11.529	VB	57.82139	9.42423e-2	5.44922		Furfural

Fig. S34 Reaction conditions: Cellulose (162 mg), C-TsOH (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20...12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 108.D
Sample Name: THD 108

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  20
Acq. Instrument : HPLC-DAD                     Location :   P1-B-07
Injection Date  : 12/26/2021 8:06:51 PM             Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 4:03:08 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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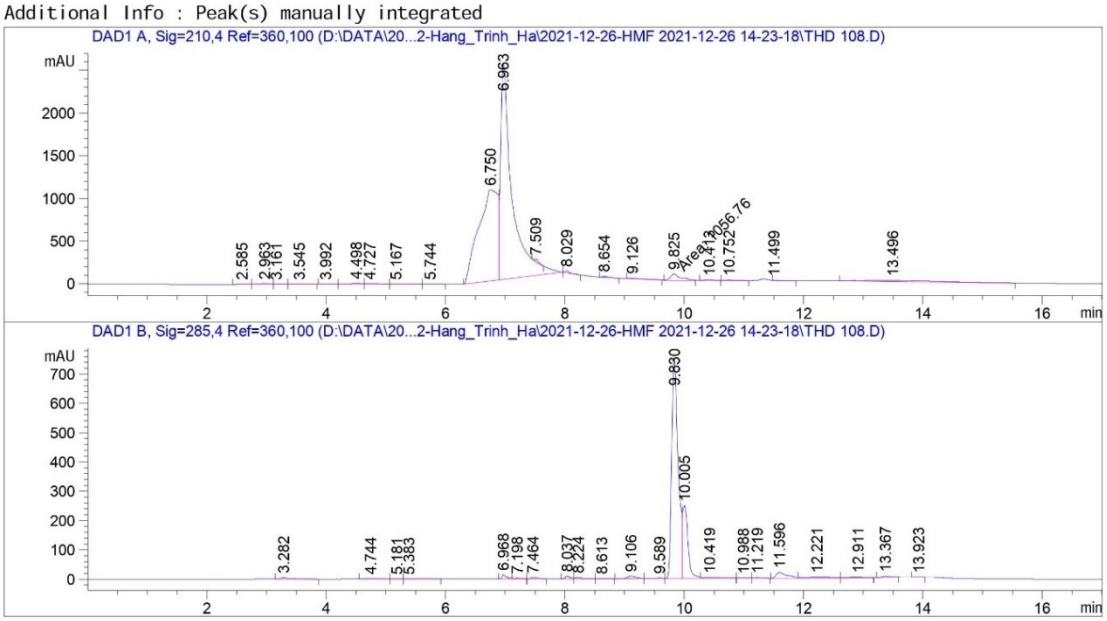


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==================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 4:03:42 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                 [ppm]
-------|------|----------|----------|----------|--|------------------
  3.992 BB       31.68664    1.44834   45.89308    Formic acid
  9.126 BB       62.94244    3.52231  221.70289    Levulinic acid
  9.825 MM     1056.76453 1.22445e-1  129.39534    HMF
 10.413 VB       45.88551 9.12493e-3 4.18702e-1    DFF
 11.400            -          -          -         FDCA
 11.499 VB       58.59129 9.44027e-2    5.53118    Furfural
```


Fig. S35 Reaction conditions: Cellulose (162 mg), C-TsOH (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20... 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56\THD 113.D
Sample Name: THD 113

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  16
Acq. Instrument : HPLC-DAD                       Location :  P1-B-03
Injection Date  : 1/2/2022 3:08:03 PM                Inj :  1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56
                  \HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 1/15/2022 9:22:34 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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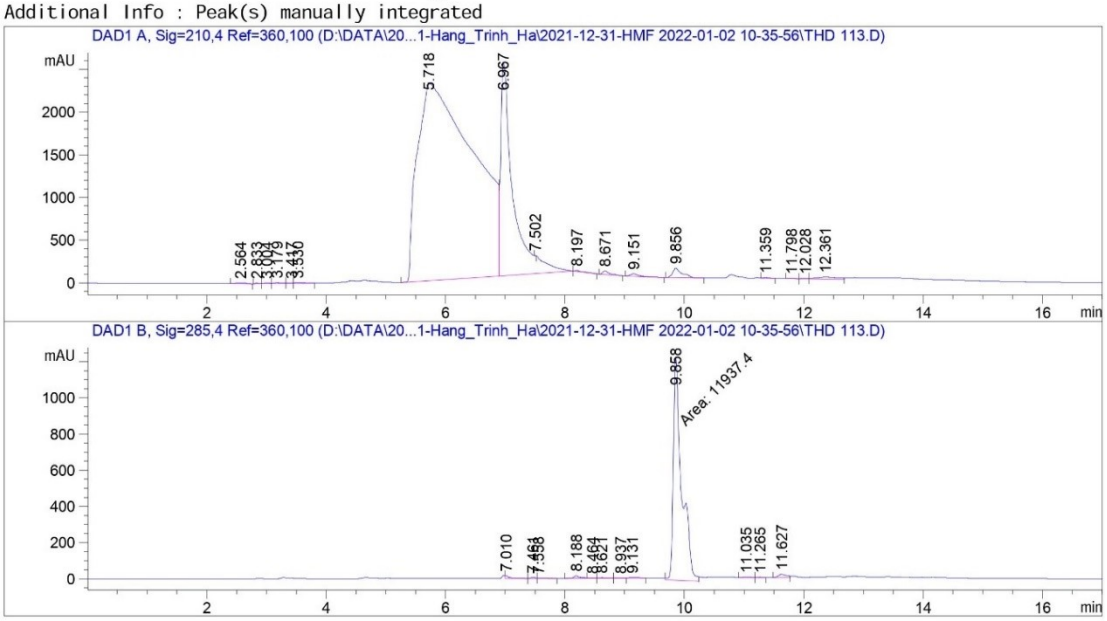


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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      1/15/2022 9:37:22 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

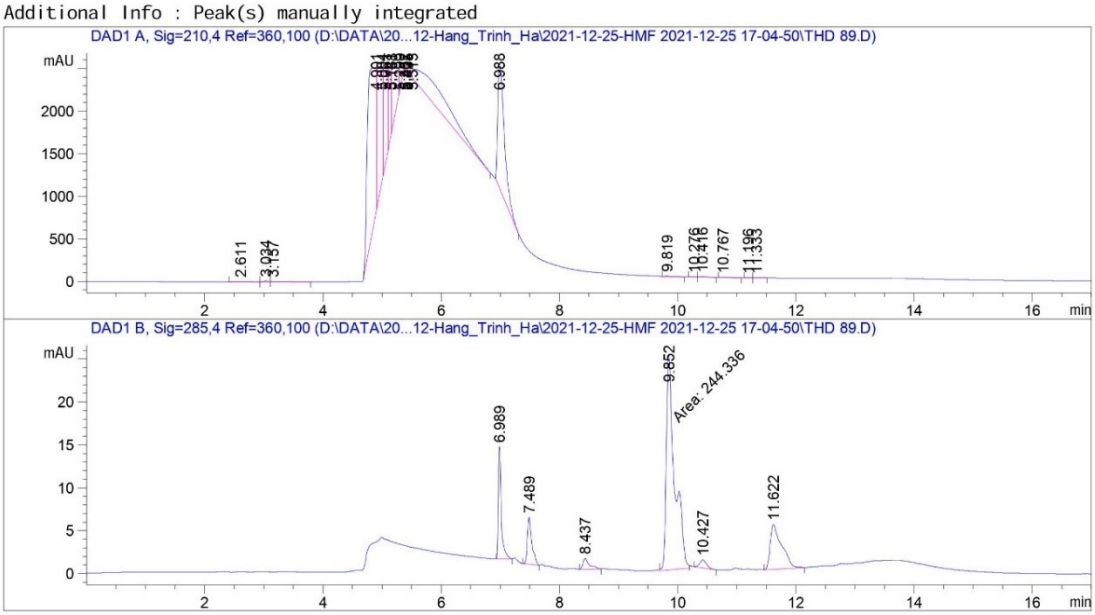
Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.530	VB	116.43640	1.32228	153.96183		Formic acid
8.900		-	-	-		Levulinic acid
9.856	BB	1245.18176	1.22646e-1	152.71603		HMF
10.600		-	-	-		DFF
11.359	VB	82.51188	9.78966e-2	8.07763		Furfural
11.798	BB	4.94747	0.00000	0.00000		FDCA

Fig. S36 Reaction conditions: Cellulose (162 mg), C-TsOH (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 89.D
Sample Name: THD 89

Acq. Operator	: SYSTEM	Seq. Line	: 49
Acq. Instrument	: HPLC-DAD	Location	: P1-E-06
Injection Date	: 12/26/2021 7:33:57 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.852	MM	244.33629	8.01830e-3	1.95916		HMF
10.427	BB	7.44019	5.37882e-2	4.00194e-1		DFF
11.097		-	-	-		FDCA

Fig. S37 Reaction conditions: Cellulose (162 mg), C-TsOH (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 94.D
Sample Name: THD 94

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Acq. Instrument : HPLC-DAD                      Location :   P1-F-02
Injection Date  : 12/26/2021 9:04:34 AM              Inj :   1
                                                Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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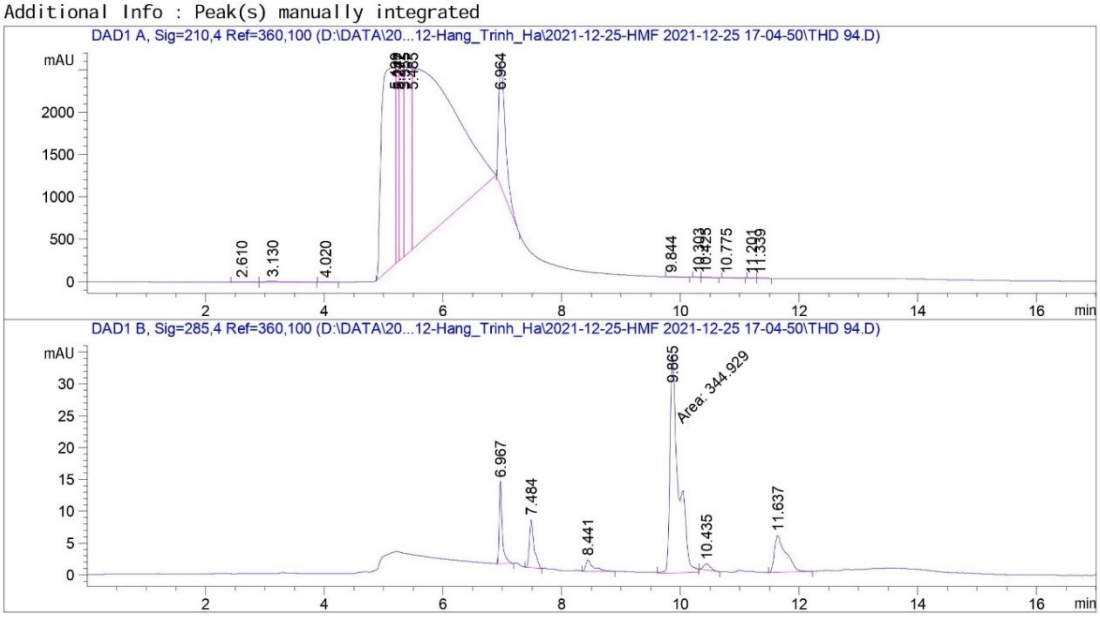


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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                 [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900           -          -          -         Levulinic acid
  9.865 MM      344.92883 8.49399e-3    2.92982    HMF
 10.435 BB        7.28798 5.46943e-2 3.98611e-1    DFF
 11.097           -          -          -         FDCA
```


Fig. S38 Reaction conditions: Cellulose (162 mg), C-TsOH (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 99.D
Sample Name: THD 99

```
==================================================================
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Acq. Instrument : HPLC-DAD                      Location :   P1-F-07
Injection Date  : 12/26/2021 10:34:59 AM             Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/29/2021 10:49:23 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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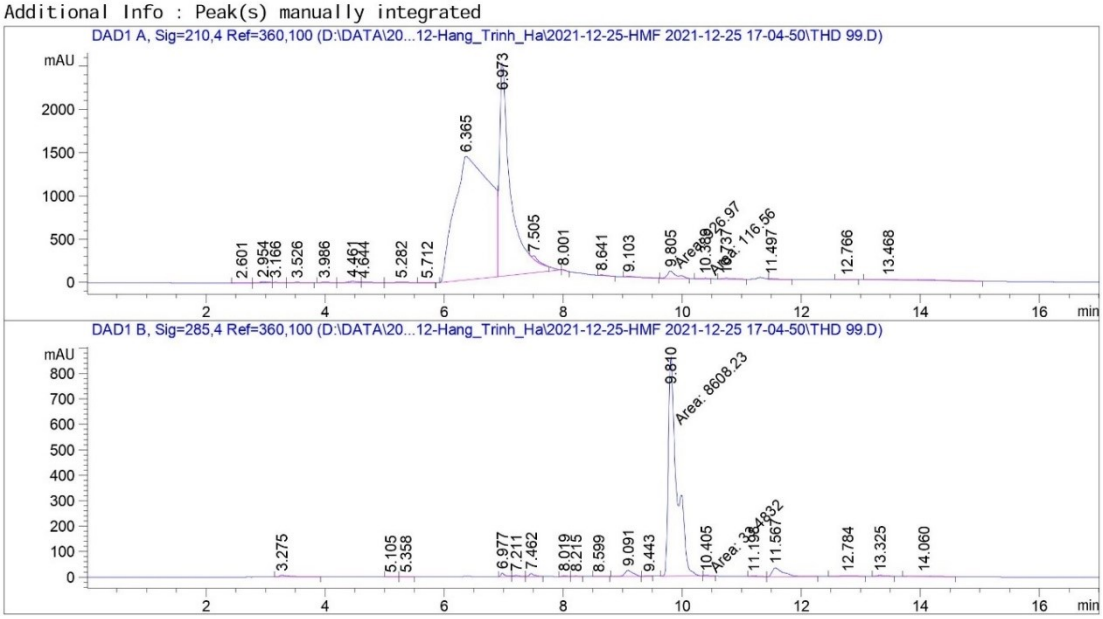


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==================================================================
                    External Standard Report
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Calib. Data Modified  :      12/29/2021 10:46:14 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.986	BB	65.77831	1.35858	89.36511		Formic acid
9.103	BB	85.86153	3.49855	300.39112		Levulinic acid
9.805	MM	926.97028	1.22259e-1	113.33051		HMF
10.389	MM	116.56023	4.10179e-2	4.78106		DFF
11.400		-	-	-		FDCA
11.497	VB	77.56612	9.73509e-2	7.55113		Furfural

Fig. S39 Reaction conditions: Cellulose (162 mg), C-TsOH (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20...12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 109.D
Sample Name: THD 109

```
==================================================================
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Acq. Instrument : HPLC-DAD                      Location :   P1-B-08
Injection Date  : 12/26/2021 8:24:57 PM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 4:11:12 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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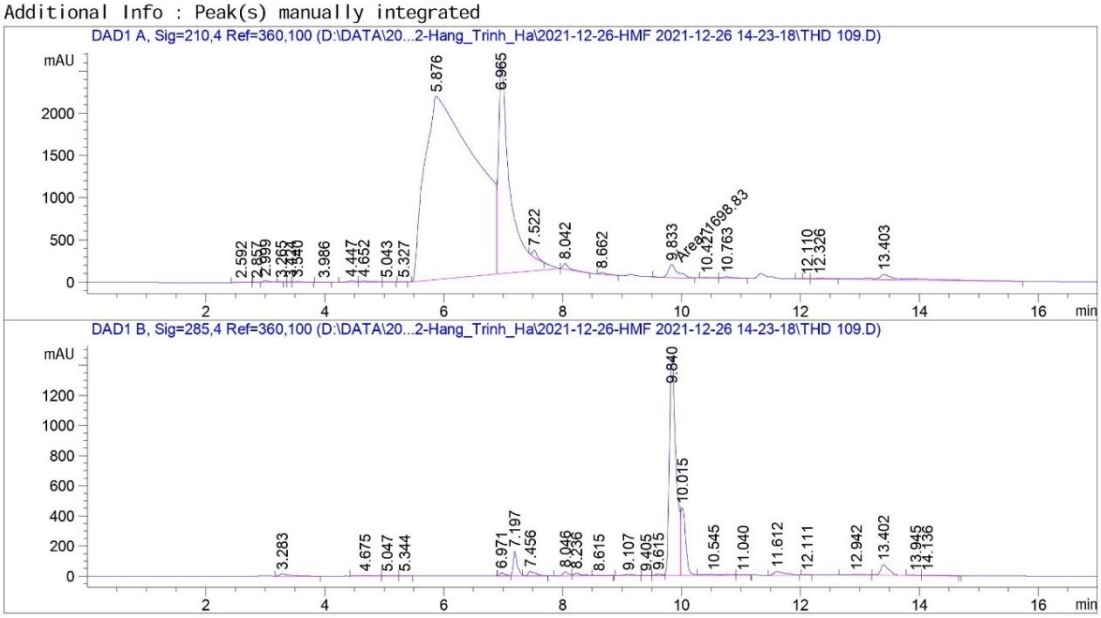


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==================================================================
                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 4:11:50 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.986	BB	11.42219	1.75560	20.05284		Formic acid
9.100		-	-	-		Levulinic acid
9.833	MM	1698.83325	1.22946e-1	208.86517		HMF
10.427	BV	54.88454	1.77493e-2	9.74162e-1		DFF
11.400		-	-	-		FDCA
11.500		-	-	-		Furfural

Fig. S40 Reaction conditions: Cellulose (162 mg), C-TsOH (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20... 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56\THD 114.D
Sample Name: THD 114

```
==================================================================
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Acq. Instrument : HPLC-DAD                      Location :   P1-B-04
Injection Date  : 1/2/2022 3:26:12 PM                Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56
                  \HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 1/15/2022 9:22:34 AM by SYSTEM
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Additional Info : Peak(s) manually integrated
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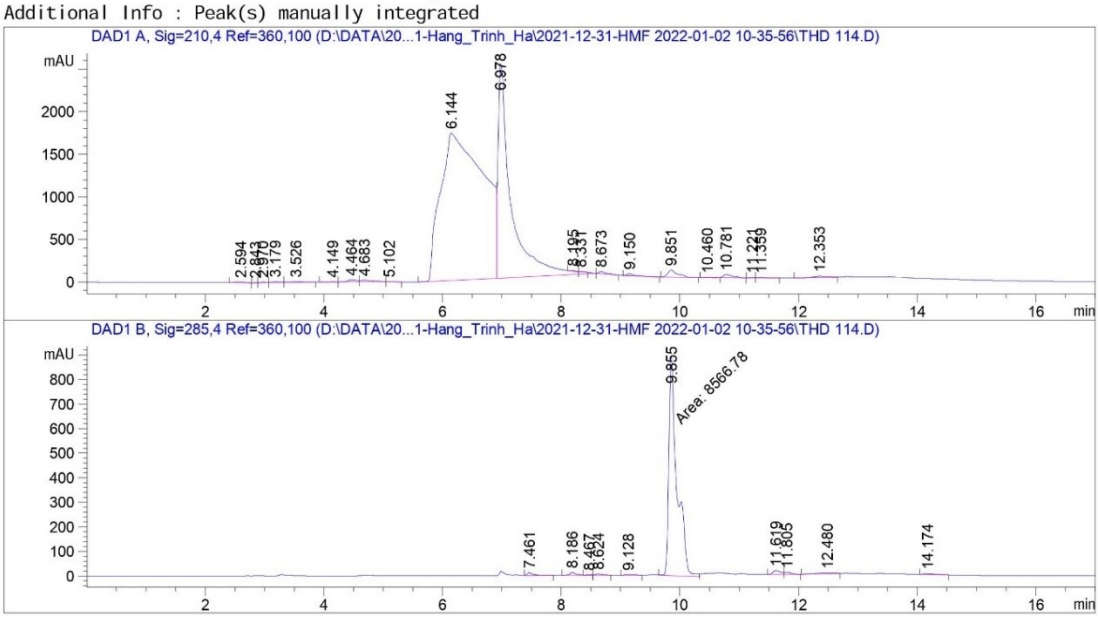


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                      External Standard Report
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Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.526	VB	172.69521	1.30693	225.70031		Formic acid
8.900		-	-	-		Levulinic acid
9.851	BB	963.32281	1.22316e-1	117.82992		HMF
10.460	BV E	37.21394	0.00000	0.00000		DFF
11.221	BV	38.93731	8.83195e-2	3.43892		Furfural
11.359	VB	88.85829	1.65493e-1	14.70539		FDCA

Fig. S41 Reaction conditions: Cellulose (162 mg), C-TsOH (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 90.D
Sample Name: THD 90

```
==================================================================
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Acq. Instrument : HPLC-DAD                      Location :   P1-E-07
Injection Date  : 12/26/2021 7:52:01 AM              Inj :   1
                                                Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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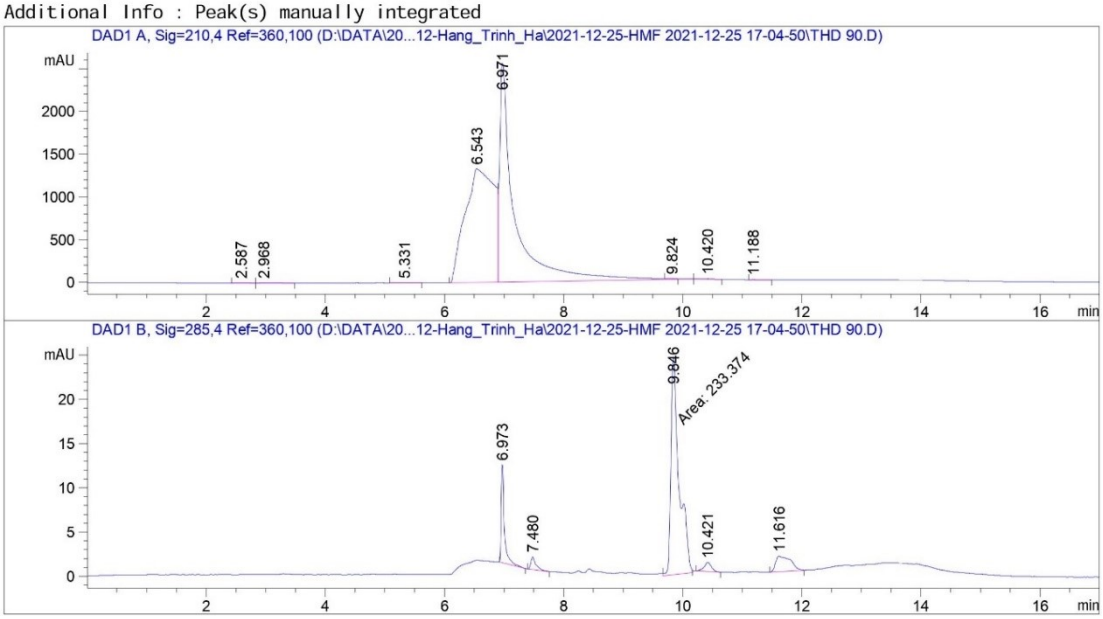


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==================================================================
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.846	MM	233.37379	7.94168e-3	1.85338		HMF
10.421	BB	8.74920	4.72970e-2	4.13811e-1		DFF
11.097		-	-	-		FDCA

Fig. S42 Reaction conditions: Cellulose (162 mg), C-TsOH (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 95.D
Sample Name: THD 95

```
==========================================================================
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Acq. Instrument : HPLC-DAD                        Location :   P1-F-03
Injection Date  : 12/26/2021 9:22:38 AM                Inj :   1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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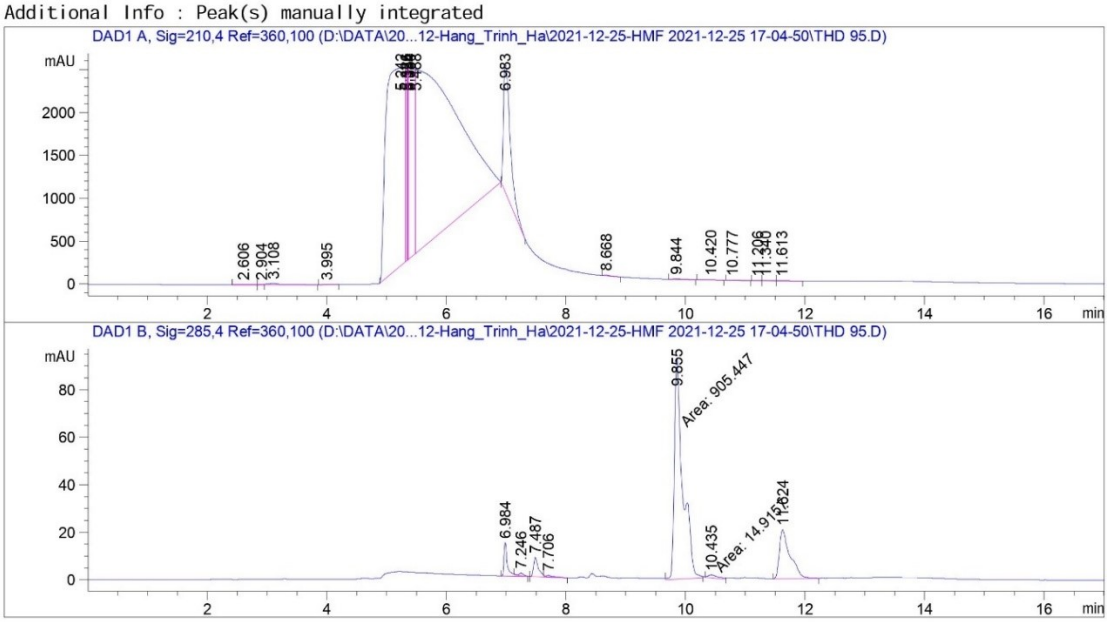


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==========================================================================
                        External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900            -          -          -         Levulinic acid
  9.855 MM      905.44720 9.20925e-3    8.33849    HMF
 10.435 MM       14.91570 3.20437e-2 4.77954e-1    DFF
 11.097            -          -          -         FDCA
```


Fig. S43 Reaction conditions: Cellulose (162 mg), C-TsOH (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20...12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 100.D
Sample Name: THD 100

```
======================================================================
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Acq. Instrument : HPLC-DAD                      Location :  P1-F-08
Injection Date  : 12/26/2021 10:53:04 AM            Inj :  1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/29/2021 10:49:23 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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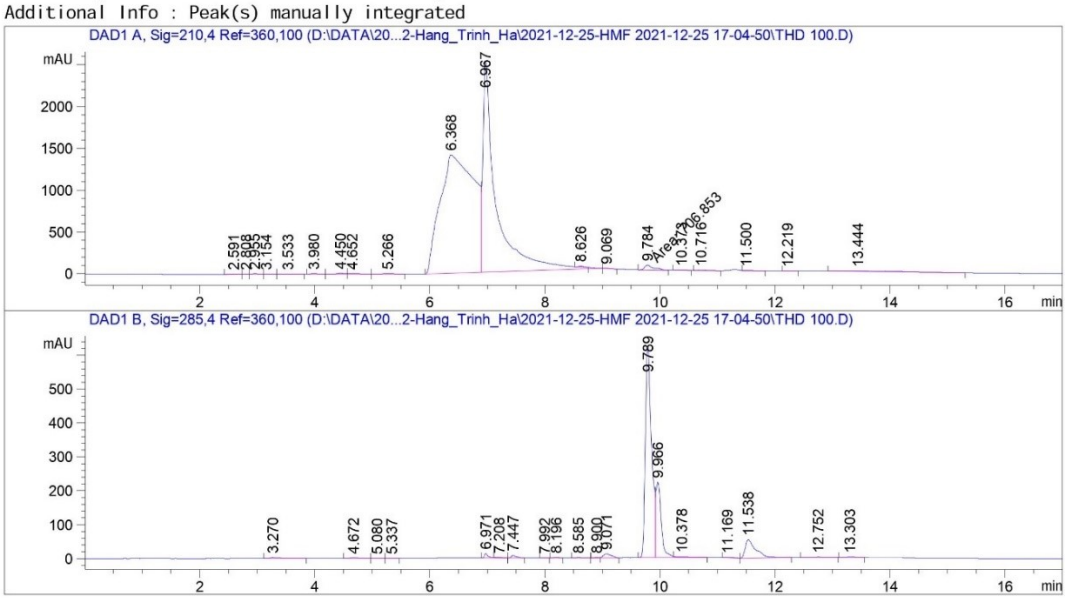


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======================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:46:14 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.980	BB	58.48380	1.36899	80.06350		Formic acid
9.069	BB	26.65977	3.64344	97.13342		Levulinic acid
9.784	MM	706.85278	1.21788e-1	86.08623		HMF
10.373	BB	40.32393	1.87026e-3	7.54163e-2		DFF
11.400		-	-	-		FDCA
11.500	VB	87.90183	9.84213e-2	8.65142		Furfural

Fig. S44 Reaction conditions: Cellulose (162 mg), C-TsOH (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20...12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 110.D
Sample Name: THD 110

```
==================================================================
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Acq. Instrument : HPLC-DAD                      Location :   P1-B-09
Injection Date  : 12/26/2021 8:42:57 PM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 4:11:12 AM by SYSTEM
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Additional Info : Peak(s) manually integrated
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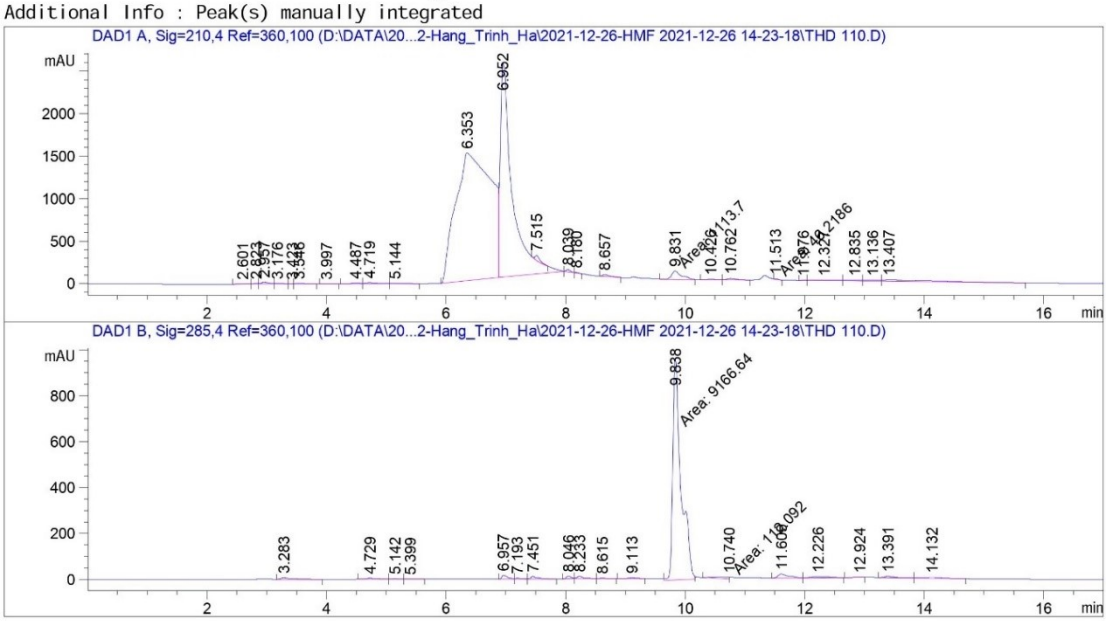


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==================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 4:11:50 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.997	BB	9.48393	1.85380	17.58126		Formic acid
9.100		-	-	-		Levulinic acid
9.831	MM	1113.69763	1.22513e-1	136.44204		HMF
10.426	BV	55.05600	1.78862e-2	9.84745e-1		DFF
11.400		-	-	-		FDCA
11.513	MM	46.21861	9.11765e-2	4.21405		Furfural

Fig. S45 Reaction conditions: Cellulose (162 mg), C-TsOH (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20...12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 105.D
Sample Name: THD 105

```
==========================================================================
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Acq. Instrument : HPLC-DAD                        Location :   P1-B-04
Injection Date  : 12/26/2021 7:12:38 PM               Inj :    1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 4:03:08 AM by SYSTEM
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Additional Info : Peak(s) manually integrated
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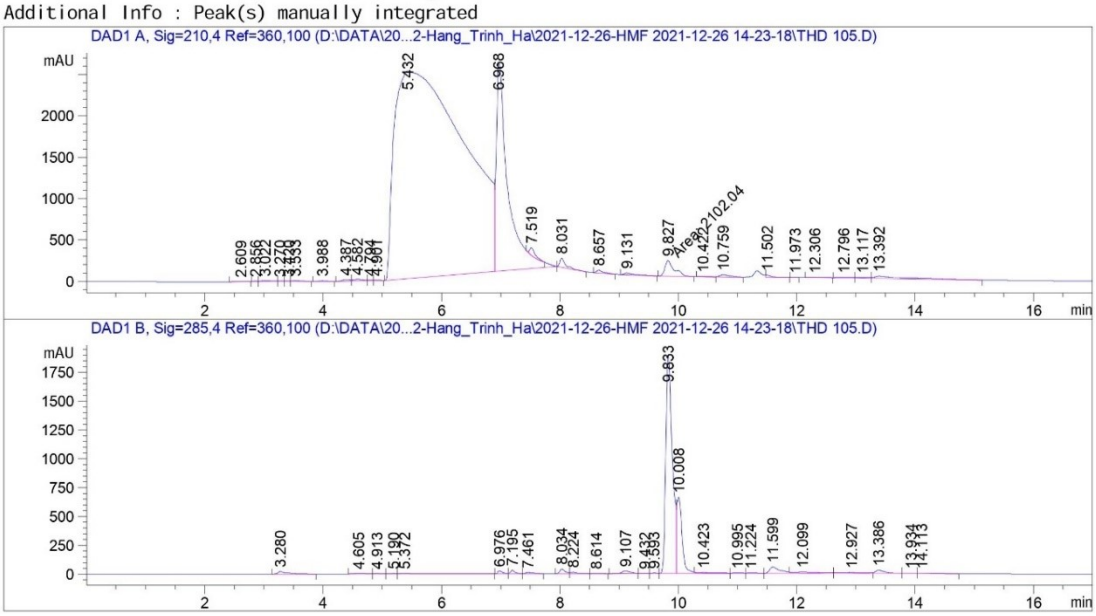


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 4:03:42 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                 [ppm]
-------|------|----------|----------|----------|--|------------------
  3.988 BB       61.88739   1.36383    84.40360     Formic acid
  9.131 BB      240.84747   3.45657   832.50511     Levulinic acid
  9.827 MM     2102.04443 1.23105e-1   258.77123     HMF
 10.422 BV E     47.78797 1.12189e-2 5.36130e-1     DFF
 11.400            -          -          -          FDCA
 11.502 VB      190.56761 1.02749e-1   19.58065     Furfural
```


Fig. S46 Reaction conditions: Cellulose (162 mg), C-TsOH (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 91.D
Sample Name: THD 91

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  51
Acq. Instrument : HPLC-DAD                      Location :   P1-E-08
Injection Date  : 12/26/2021 8:10:05 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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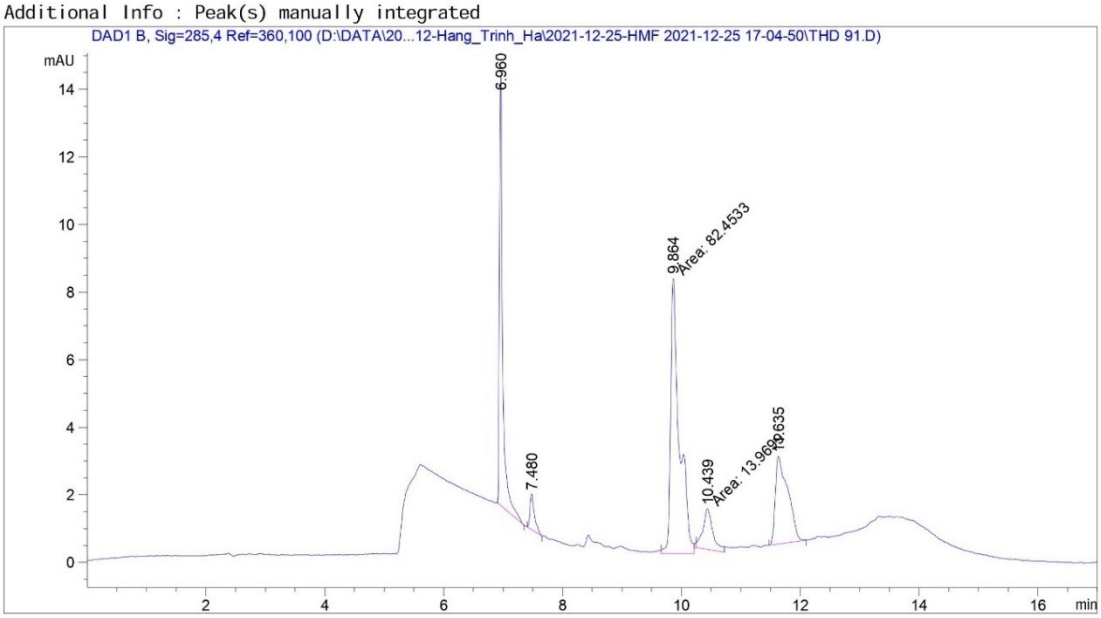


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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.864	MM	82.45334	4.81590e-3	3.97087e-1		HMF
10.439	MM	13.96994	3.35088e-2	4.68116e-1		DFF
11.097		-	-	-		FDCA
11.635	BB	37.87191	3.61751e-3	1.37002e-1		Furfural

Totals : 1.00221

Fig. S47 Reaction conditions: Cellulose (162 mg), C-TsOH (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 96.D
Sample Name: THD 96

```
======================================================================
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Acq. Instrument : HPLC-DAD                        Location :   P1-F-04
Injection Date  : 12/26/2021 9:40:46 AM                Inj :   1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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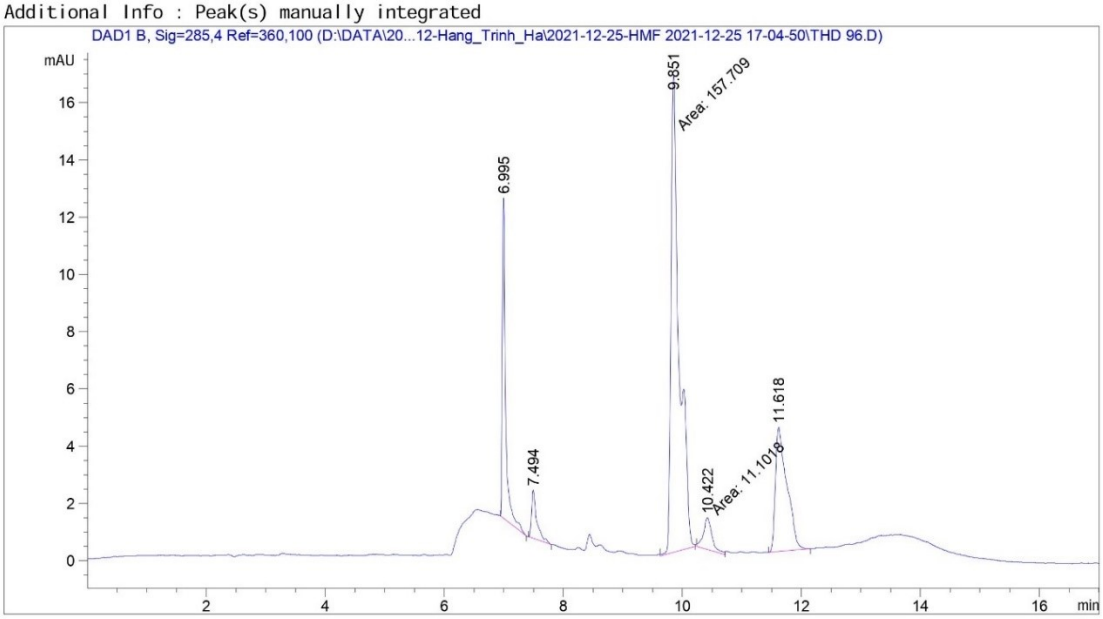


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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```

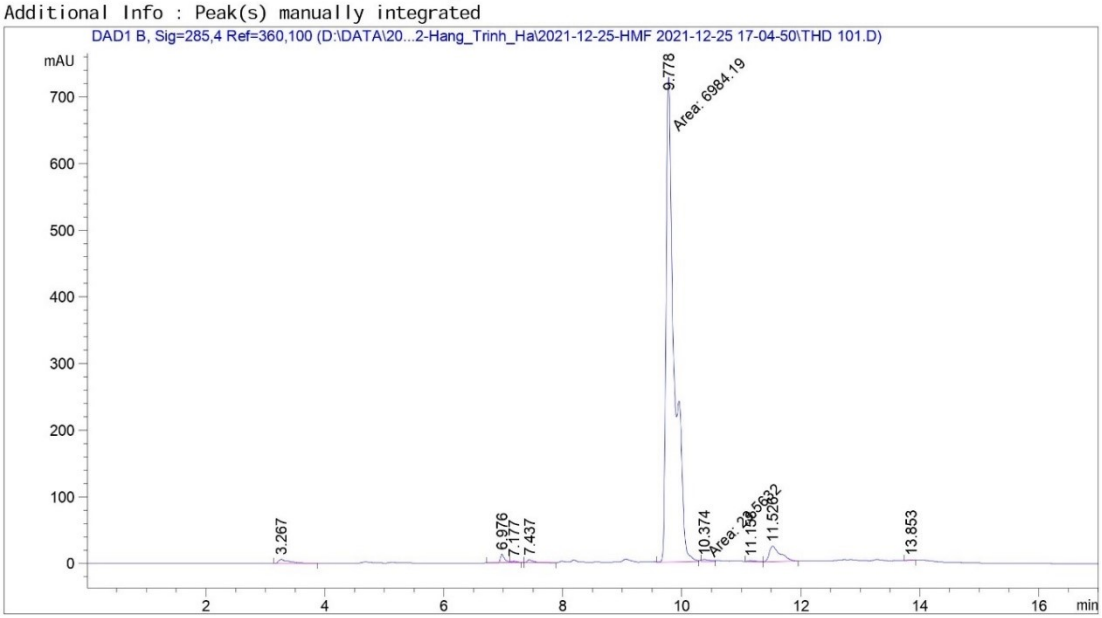
RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.851	MM	157.70862	7.12235e-3	1.12326		HMF
10.422	MM	11.10181	3.94785e-2	4.38282e-1		DFF
11.097		-	-	-		FDCA
11.618	BB	58.24413	5.92531e-3	3.45114e-1		Furfural

Totals : 1.90665

Fig. S48 Reaction conditions: Cellulose (162 mg), C-TsOH (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20...12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 101.D
Sample Name: THD 101

Acq. Operator	: SYSTEM	Seq. Line	: 61
Acq. Instrument	: HPLC-DAD	Location	: P1-F-09
Injection Date	: 12/26/2021 11:11:06 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

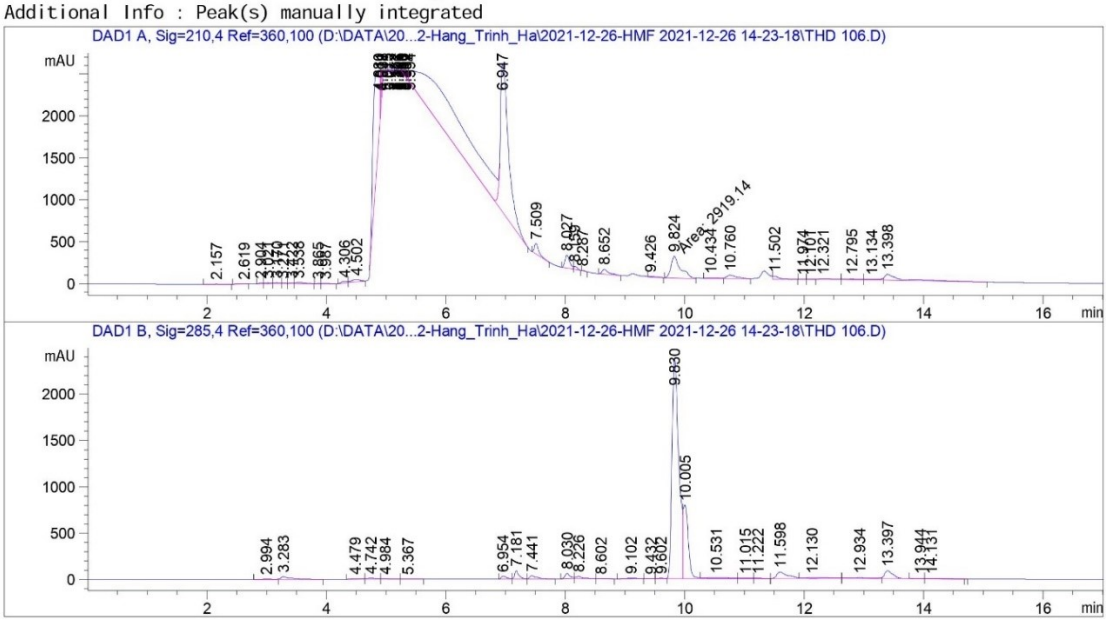
Signal 1: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.778	MM	6984.19043	9.59235e-3	66.99477		HMF
10.374	MM	23.56325	2.41013e-2	5.67904e-1		DFF
11.158	BB	9.96571	0.00000	0.00000		FDCA
11.526	BB	292.92328	9.36245e-3	2.74248		Furfural
Totals :				70.30516		

Fig. S49 Reaction conditions: Cellulose (162 mg), C-TsOH (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20...12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 106.D
Sample Name: THD 106

Acq. Operator	: SYSTEM	Seq. Line	: 18
Acq. Instrument	: HPLC-DAD	Location	: P1-B-05
Injection Date	: 12/26/2021 7:30:43 PM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_KQ.M		
Last changed	: 12/30/2021 4:03:08 AM by SYSTEM (modified after loading)		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By	: Signal
Calib. Data Modified	: 12/30/2021 4:03:42 AM
Multiplier	: 1.0000
Dilution	: 1.0000

Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.987	VB	23.38481	1.50983	35.30699		Formic acid
9.000		-	-	-		Levulinic acid
9.426	VB	79.35126	1.06103e-1	8.41941		HMF
10.434	BV E	58.71129	2.06155e-2	1.21036		DFF
11.400		-	-	-		FDCA
11.502	VB	244.84567	1.03570e-1	25.35879		Furfural

Fig. S50 Reaction conditions: Cellulose (162 mg), C-TsOH (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 12 h

Data File D:\DATA\20...12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 111.D
Sample Name: THD 111

```
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Acq. Operator   : SYSTEM                        Seq. Line :  23
Acq. Instrument : HPLC-DAD                      Location :   P1-C-01
Injection Date  : 12/26/2021 9:01:00 PM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 4:11:12 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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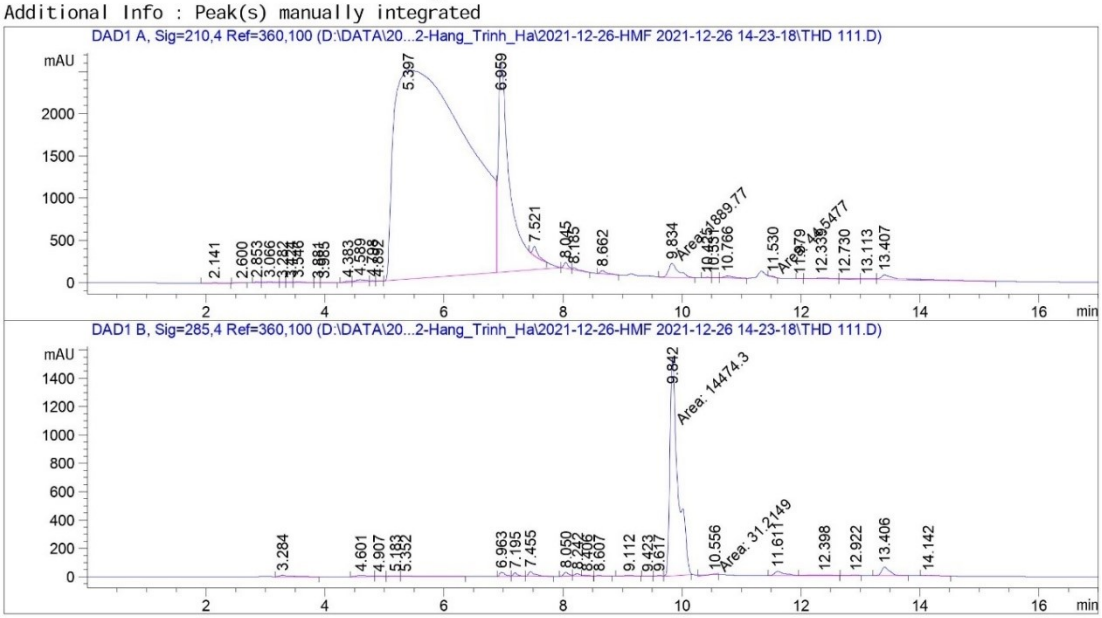


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 4:11:50 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.985	VB	13.44587	1.68329	22.63334		Formic acid
9.100		-	-	-		Levulinic acid
9.834	MM	1889.77112	1.23030e-1	232.49784		HMF
10.425	BV	20.63692	0.00000	0.00000		DFF
11.400		-	-	-		FDCA
11.530	MM	44.54774	9.06035e-2	4.03618		Furfural

Fig. S51 Reaction conditions: Cellulose (162 mg), C-TsOH (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20...12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 104.D
Sample Name: THD 104

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  16
Acq. Instrument : HPLC-DAD                      Location :   P1-B-03
Injection Date  : 12/26/2021 6:54:35 PM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/29/2021 10:49:23 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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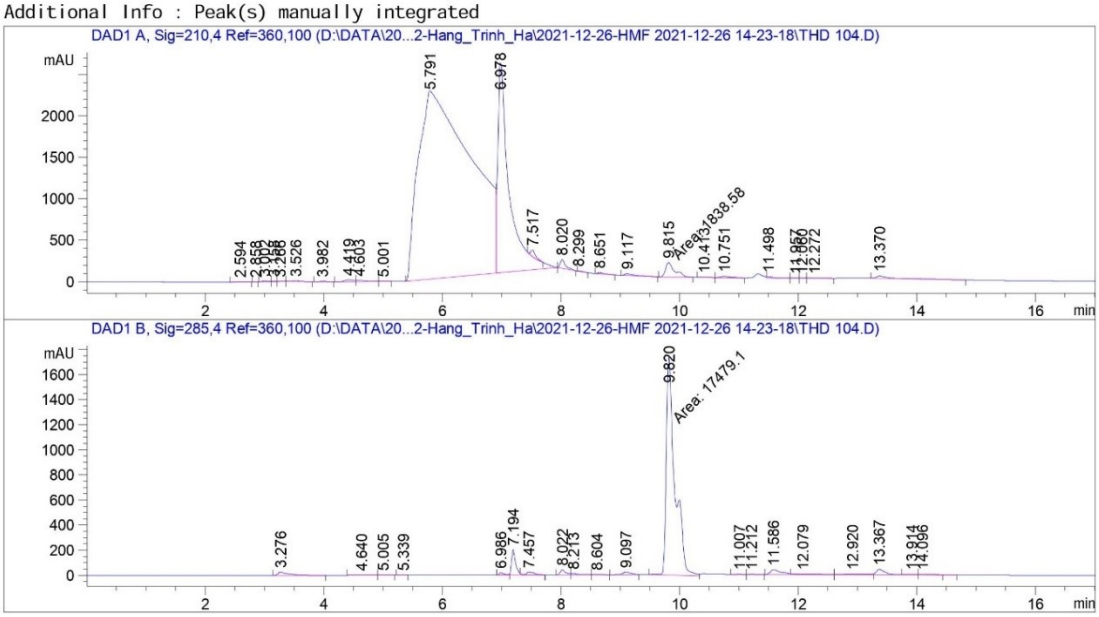


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==================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:46:14 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```
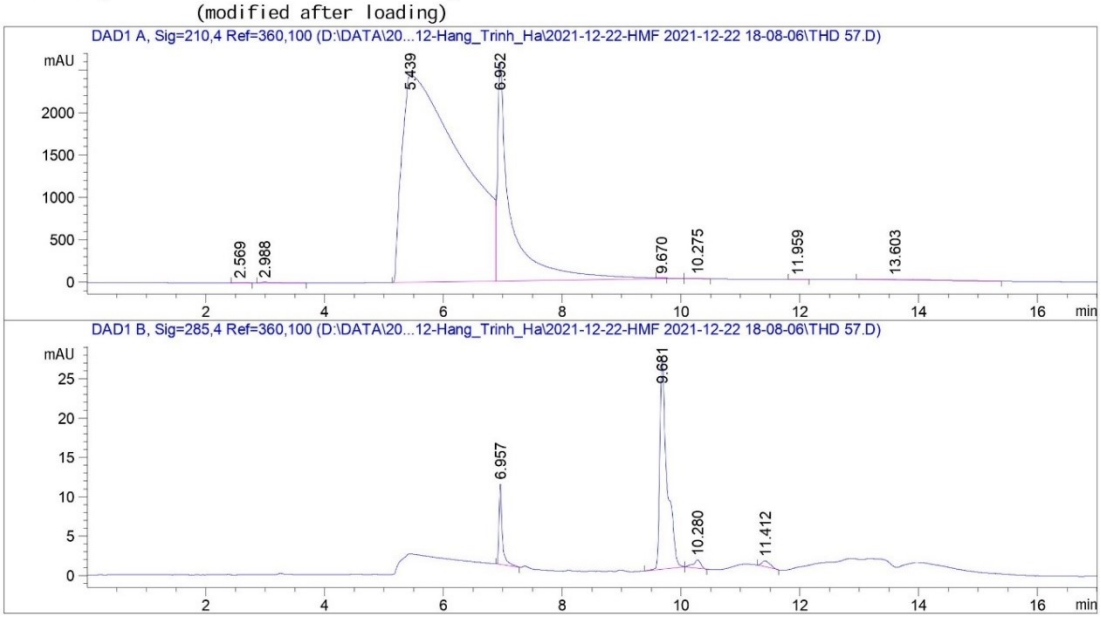

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.982	BB	45.24859	1.39643	63.18662		Formic acid
9.117	BB	226.97638	3.45799	784.88141		Levulinic acid
9.815	MM	1838.57800	1.23009e-1	226.16159		HMF
10.413	BV	46.92867	1.02941e-2	4.83090e-1		DFF
11.400		-	-	-		FDCA
11.498	VB	136.67831	1.01288e-1	13.84389		Furfural

Fig. S52 Reaction conditions: Cellulose (162 mg), C-TsOH (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 57.D
Sample Name: THD 57

Acq. Operator	: SYSTEM	Seq. Line	: 43
Acq. Instrument	: HPLC-DAD	Location	: P1-D-09
Injection Date	: 12/23/2021 6:49:22 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/24/2021 11:12:35 AM by SYSTEM (modified after loading)		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/24/2021 11:13:44 AM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

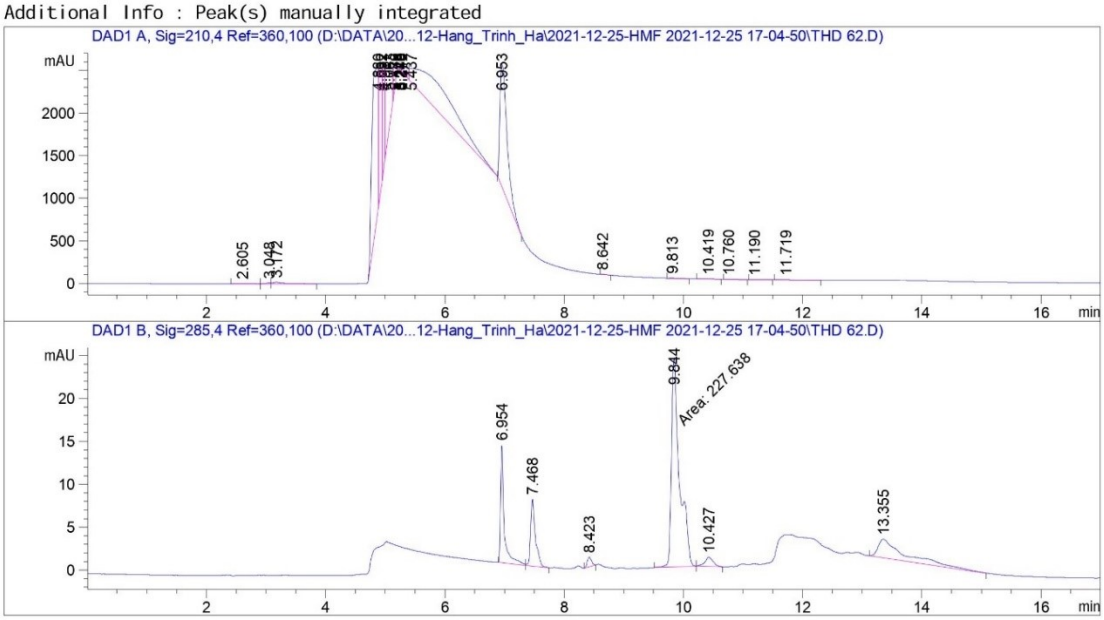
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.800		-	-	-		Levulinic acid
9.681	BB	228.67378	7.90658e-3	1.80803		HMF
10.280	BB	9.17616	4.55803e-2	4.18252e-1		DFF
11.097		-	-	-		FDCA

Fig. S53 Reaction conditions: Cellulose (162 mg), C-HCl (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 62.D
Sample Name: THD 62

Acq. Operator	: SYSTEM	Seq. Line	: 27
Acq. Instrument	: HPLC-DAD	Location	: P1-C-02
Injection Date	: 12/26/2021 12:55:47 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/27/2021 12:50:01 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/27/2021 12:49:10 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

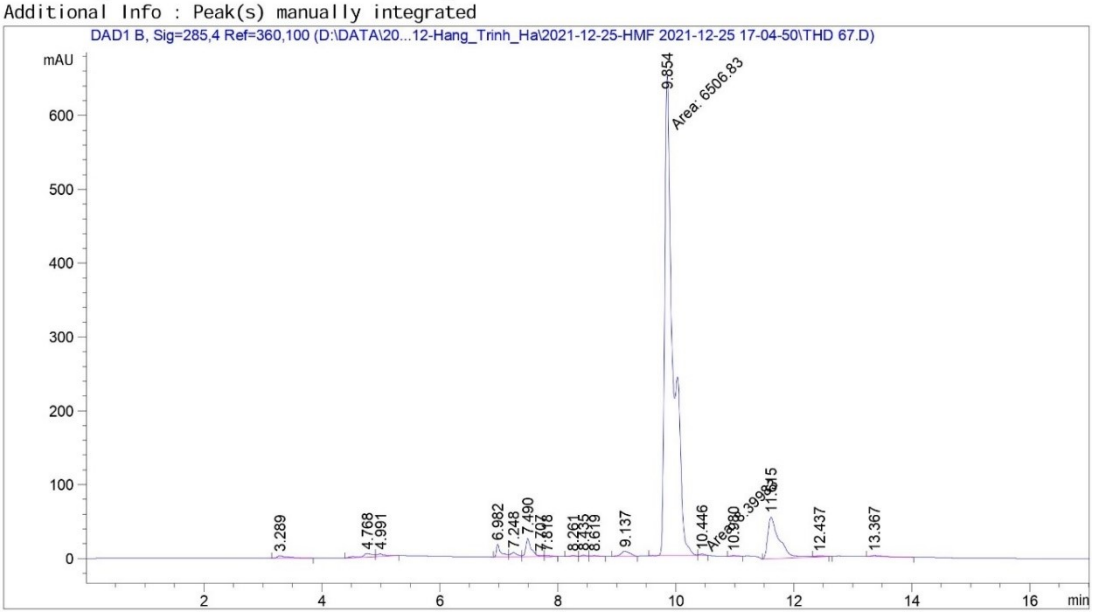
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.844	MM	227.63783	7.89865e-3	1.79803		HMF
10.427	BB	9.91554	4.29571e-2	4.25943e-1		DFF
11.097		-	-	-		FDCA

Fig. S54 Reaction conditions: Cellulose (162 mg), C-HCl (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 67.D
Sample Name: THD 67

Acq. Operator	: SYSTEM	Seq. Line	: 32
Acq. Instrument	: HPLC-DAD	Location	: P1-C-07
Injection Date	: 12/26/2021 2:26:11 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.854	MM	6506.83203	9.58816e-3	62.38855		HMF
10.446	MM	8.39983	4.88315e-2	4.10177e-1		DFF
10.980	BB	6.84729	0.00000	0.00000		FDCA
11.615	BV R	764.17719	9.88851e-3	7.55657		Furfural

Totals : 70.35530

Fig. S55 Reaction conditions: Cellulose (162 mg), C-HCl (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 72.D
Sample Name: THD 72

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  37
Acq. Instrument : HPLC-DAD                      Location :  P1-D-03
Injection Date  : 12/26/2021 3:56:48 AM             Inj :  1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 11:17:48 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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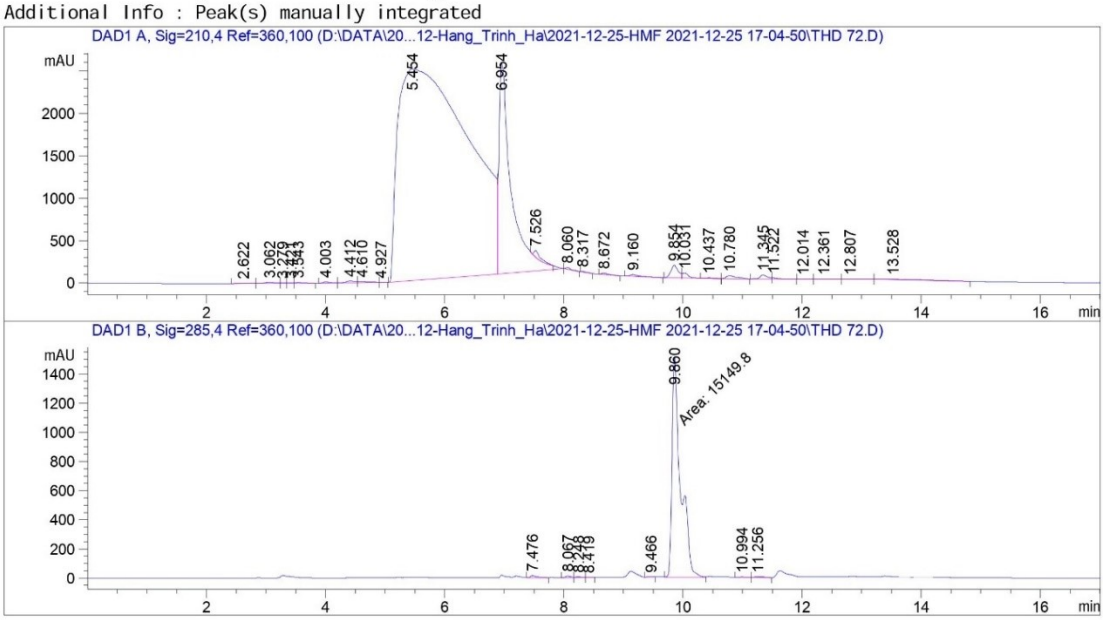


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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 11:18:35 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900           -          -          -         Levulinic acid
  9.860 MM     1.51498e4  9.62310e-3  145.78803    HMF
 10.401            -          -          -         DFF
```


Fig. S56 Reaction conditions: Cellulose (162 mg), C-HCl (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 12 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 77.D
Sample Name: THD 77

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  42
Acq. Instrument : HPLC-DAD                      Location :   P1-D-08
Injection Date  : 12/26/2021 5:27:25 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 12:02:08 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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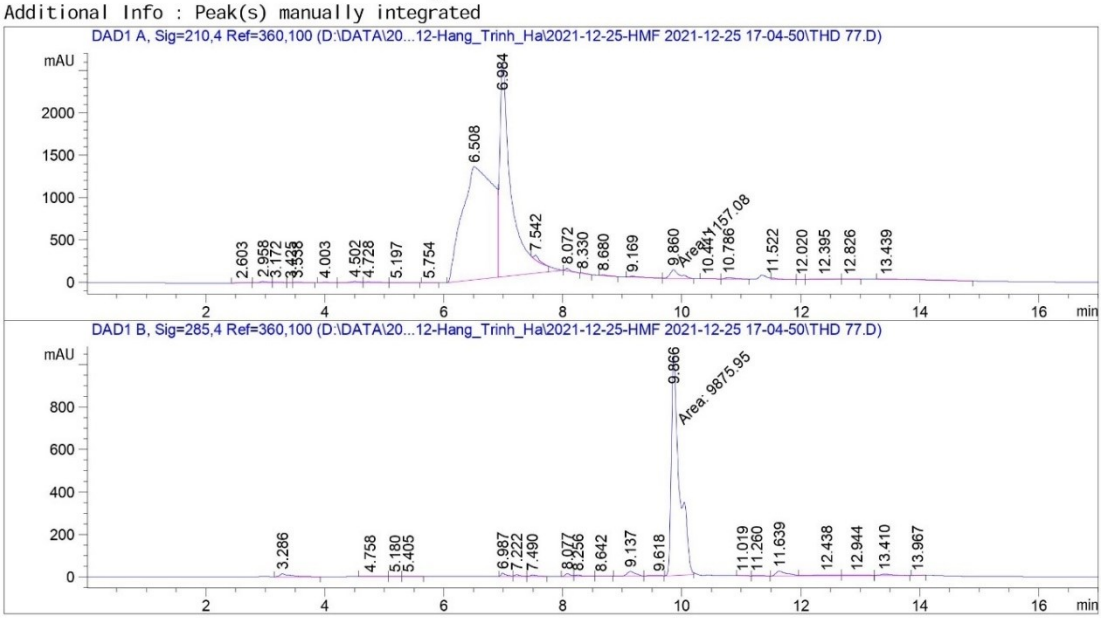


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 12:02:52 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
4.003	BB	46.29803	1.39368	64.52481		Formic acid
9.169	BB	123.45938	3.47868	429.47599		Levulinic acid
9.860	MM	1157.07947	1.22560e-1	141.81147		HMF
10.441	VV	43.36400	6.06639e-3	2.63063e-1		DFF
11.400		-	-	-		FDCA
11.522	VB	107.17141	9.98657e-2	10.70275		Furfural

Fig. S57 Reaction conditions: Cellulose (162 mg), C-HCl (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20... 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 82.D
Sample Name: THD 82

```
==========================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  24
Acq. Instrument : HPLC-DAD                        Location :   P1-C-02
Injection Date  : 12/26/2021 9:19:31 PM               Inj :   1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/29/2021 10:49:23 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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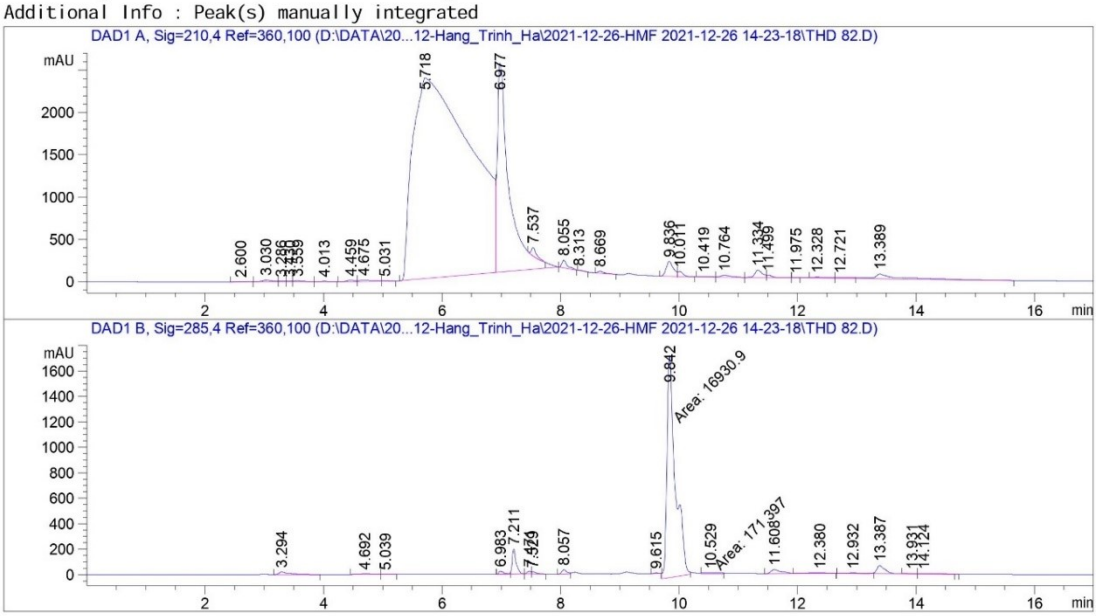


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:46:14 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```
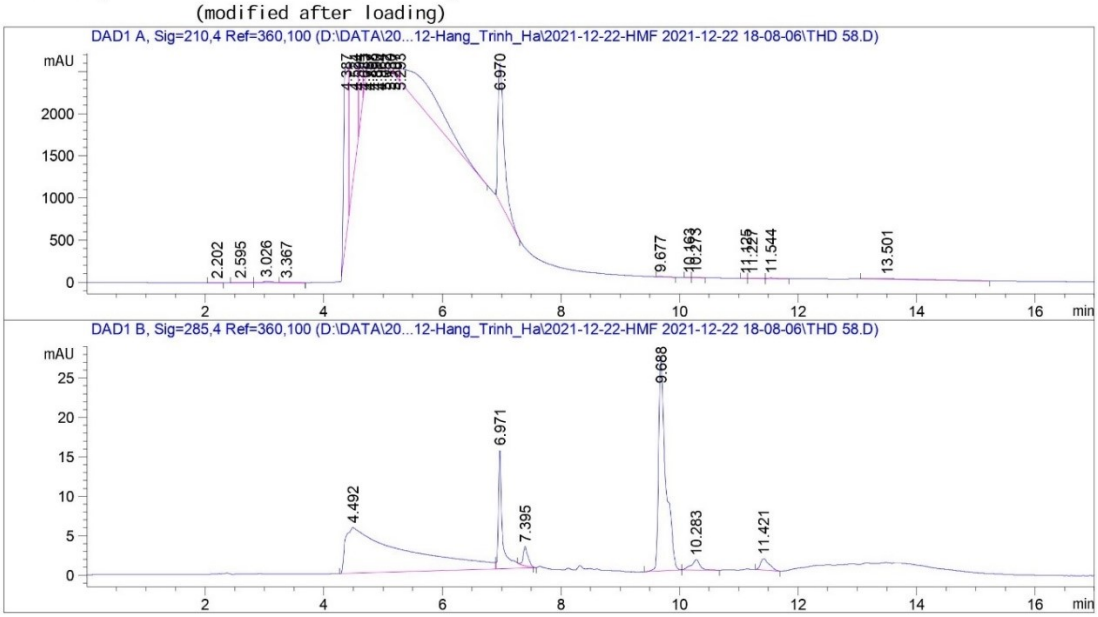

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
4.013	BB	38.37037	1.41817	54.41585		Formic acid
8.900		-	-	-		Levulinic acid
9.836	BV	1518.73718	1.22848e-1	186.57440		HMF
10.419	BV	59.54186	2.11890e-2	1.26163		DFF
11.334	BV	796.50177	1.97459e-1	157.27661		FDCA
11.499	VB	190.42552	1.02746e-1	19.56552		Furfural

Fig. S58 Reaction conditions: Cellulose (162 mg), C-HCl (1 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 58.D
Sample Name: THD 58

Acq. Operator	: SYSTEM	Seq. Line	: 44
Acq. Instrument	: HPLC-DAD	Location	: P1-E-01
Injection Date	: 12/23/2021 7:07:39 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/24/2021 11:12:35 AM by SYSTEM (modified after loading)		



External Standard Report

Sorted By	:	Signal	
Calib. Data Modified	:	12/24/2021 11:13:44 AM	
Multiplier	:	1.0000	
Dilution	:	1.0000	

Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

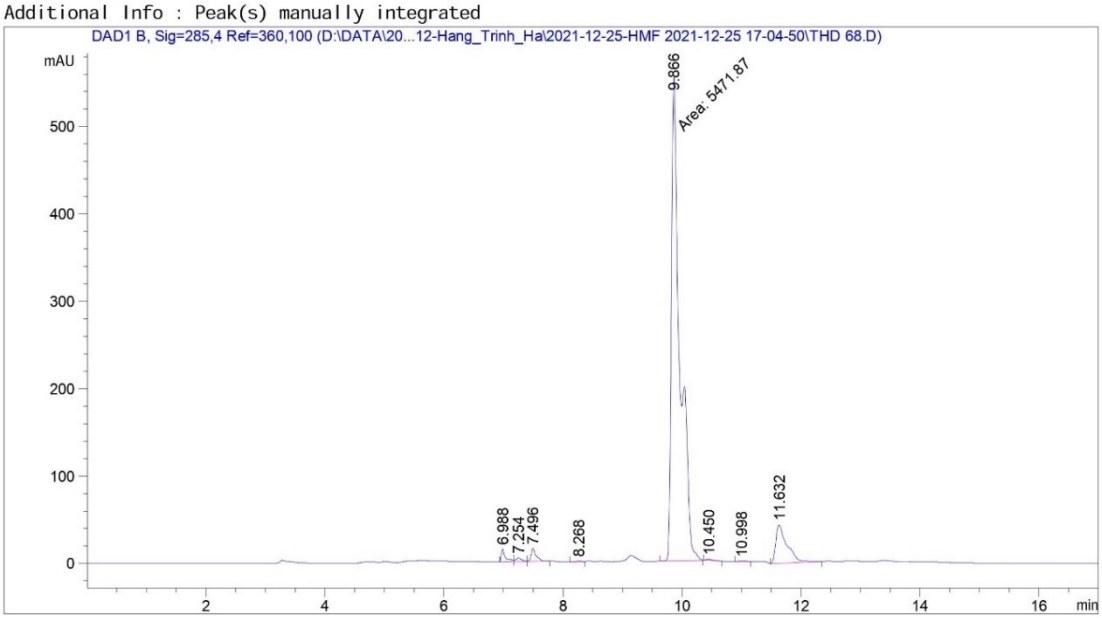
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.800		-	-	-		Levulinic acid
9.688	BB	227.81734	7.90003e-3	1.79976		HMF
10.283	BB	12.82768	3.55664e-2	4.56234e-1		DFF
11.097		-	-	-		FDCA

Fig. S59 Reaction conditions: Cellulose (162 mg), C-HCl (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 68.D
Sample Name: THD 68

Acq. Operator	: SYSTEM	Seq. Line	: 33
Acq. Instrument	: HPLC-DAD	Location	: P1-C-08
Injection Date	: 12/26/2021 2:44:17 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.866	MM	5471.86523	9.57658e-3	52.40173		HMF
10.450	BB	9.64674	4.38642e-2	4.23147e-1		DFF
10.998	BB	5.05110	0.00000	0.00000		FDCA
11.632	BB	570.64856	9.77761e-3	5.57958		Furfural
Totals :				58.40446		

Fig. S60 Reaction conditions: Cellulose (162 mg), C-HCl (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C,8 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 73.D
Sample Name: THD 73

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  38
Acq. Instrument : HPLC-DAD                      Location :   P1-D-04
Injection Date  : 12/26/2021 4:14:55 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 11:17:48 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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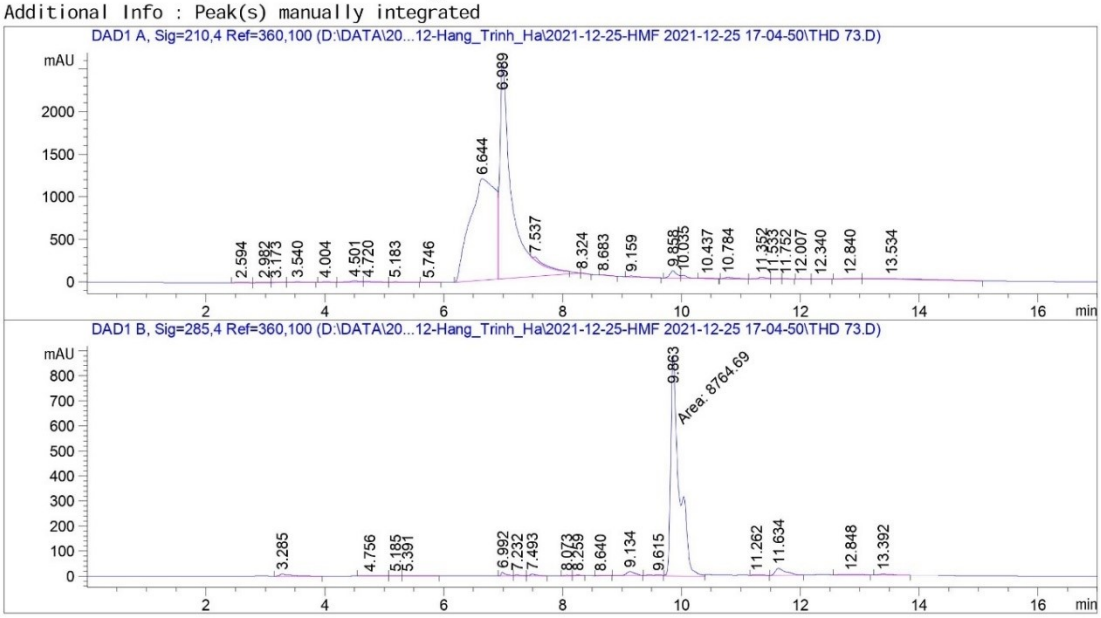


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==================================================================
                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 11:18:35 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                 [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900           -          -          -         Levulinic acid
  9.863 MM     8764.69336 9.60394e-3   84.17557    HMF
 10.401            -          -          -         DFF
```


Fig. S61 Reaction conditions: Cellulose (162 mg), C-HCl (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 12 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 79.D
Sample Name: THD 79

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  44
Acq. Instrument : HPLC-DAD                       Location :   P1-E-01
Injection Date  : 12/26/2021 6:03:34 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 12:42:33 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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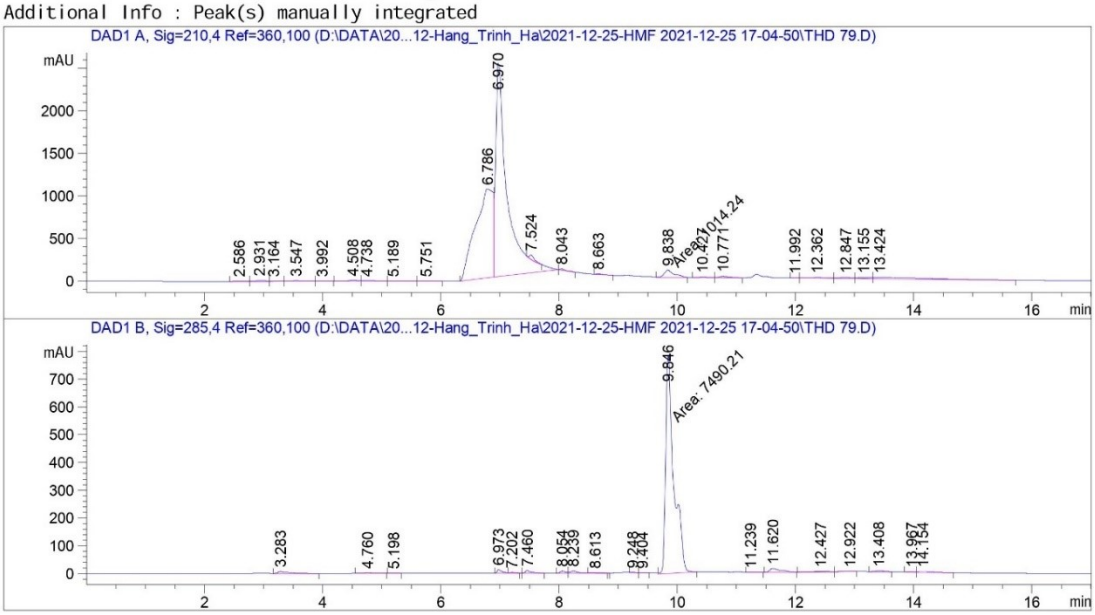


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======================================================================
                    External Standard Report
======================================================================

Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 12:42:12 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.992	BB	6.25105	2.15306	13.45885		Formic acid
9.100		-	-	-		Levulinic acid
9.838	MM	1014.24200	1.22389e-1	124.13226		HMF
10.427	BV	43.74559	6.55189e-3	2.86616e-1		DFF
11.400		-	-	-		FDCA
11.500		-	-	-		Furfural

Fig. S62 Reaction conditions: Cellulose (162 mg), C-HCl (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20... 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 83.D
Sample Name: THD 83

```
==================================================================
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Acq. Instrument : HPLC-DAD                      Location :  P1-C-03
Injection Date  : 12/26/2021 9:37:32 PM             Inj :  1
                                                Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

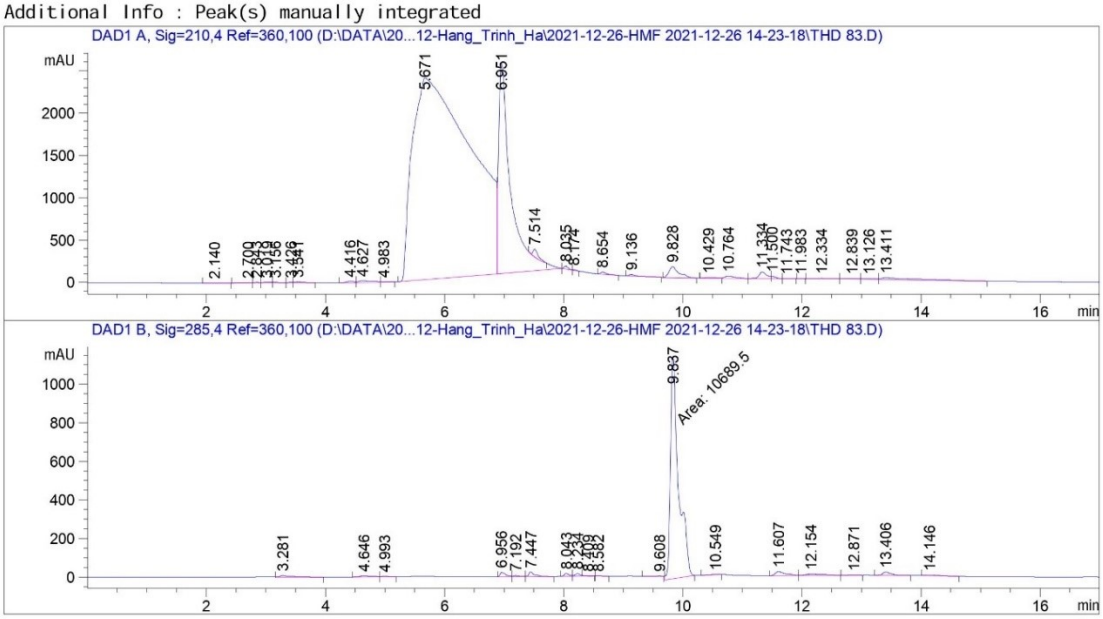


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==================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                 [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900           -          -          -         Levulinic acid
  9.837 MM     1.06895e4  9.61213e-3  102.74915    HMF
 10.549 BB       20.03700 2.65122e-2 5.31225e-1    DFF
 11.097           -          -          -         FDCA
```


Fig. S63 Reaction conditions: Cellulose (162 mg), C-HCl (5 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 59.D
Sample Name: THD 59

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  45
Acq. Instrument : HPLC-DAD                      Location :   P1-E-02
Injection Date  : 12/23/2021 7:25:43 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/24/2021 11:12:35 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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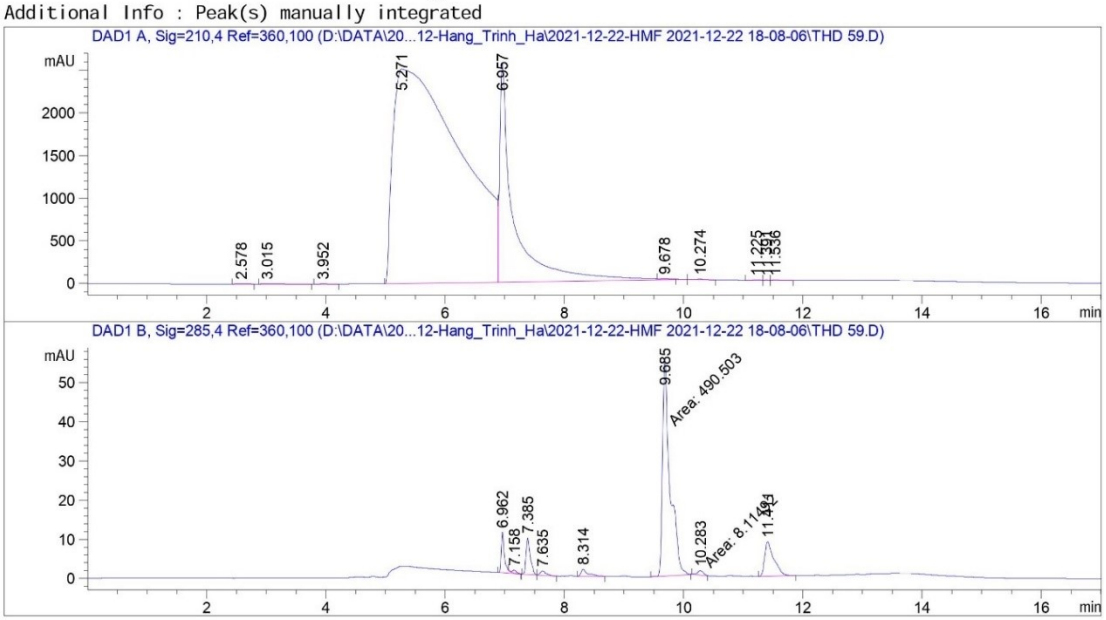


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==================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/24/2021 11:12:35 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area     Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.800           -          -          -         Levulinic acid
  9.685 MM      490.50342 8.83690e-3    4.33453    HMF
 10.283 MM        8.11492 5.01808e-2 4.07213e-1    DFF
```


Fig. S64 Reaction conditions: Cellulose (162 mg), C-HCl (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 69.D
Sample Name: THD 69

```
Acq. Operator   : SYSTEM                          Seq. Line :  34
Acq. Instrument : HPLC-DAD                        Location :   P1-C-09
Injection Date  : 12/26/2021 3:02:34 AM           Inj :   1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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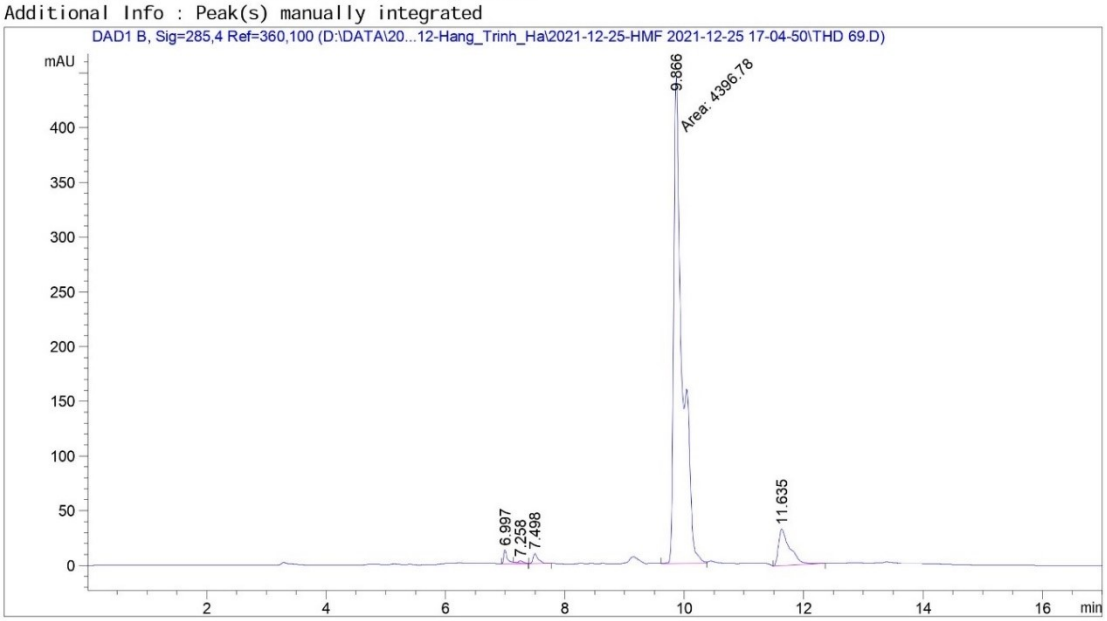


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                      External Standard Report

Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.866	MM	4396.78125	9.55877e-3	42.02780		HMF
10.401		-	-	-		DFF
11.097		-	-	-		FDCA
11.635	BB	436.15359	9.64258e-3	4.20565		Furfural
Totals :				46.23345		

Fig. S65 Reaction conditions: Cellulose (162 mg), C-HCl (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 74.D
Sample Name: THD 74

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  39
Acq. Instrument : HPLC-DAD                       Location :   P1-D-05
Injection Date  : 12/26/2021 4:32:59 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/29/2021 11:44:40 PM by SYSTEM
                  (modified after loading)
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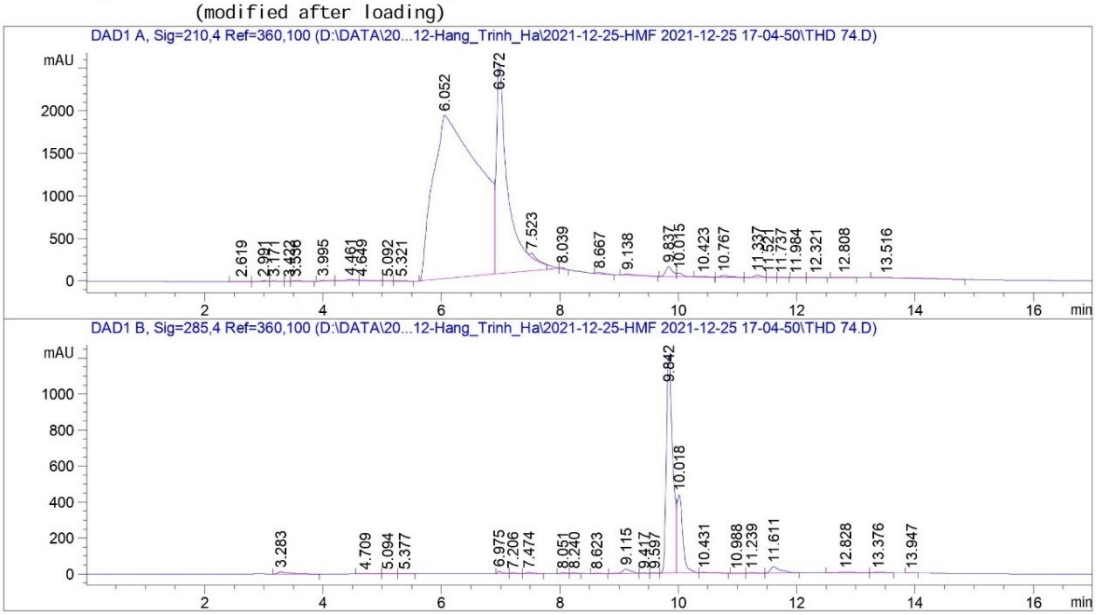


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======================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 11:54:20 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

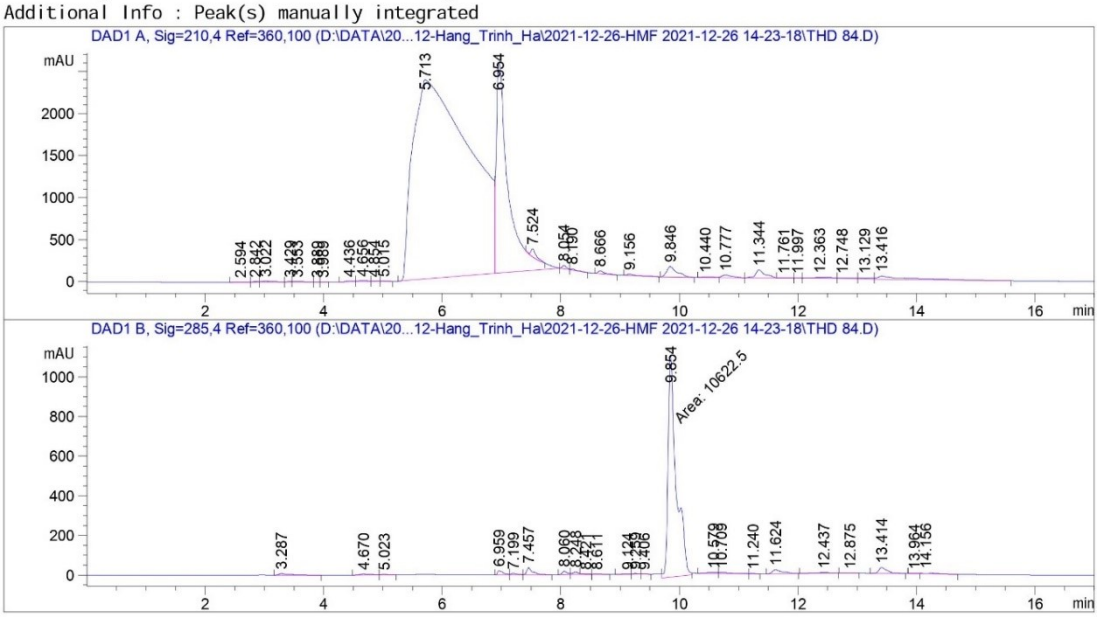
Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.995	BB	62.14554	1.36346	84.73278		Formic acid
9.138	BB	160.68103	3.46817	557.26926		Levulinic acid
9.837	BV	942.49615	1.22284e-1	115.25217		HMF
10.423	VB	E 46.48751	9.80607e-3	4.55860e-1		DFF
11.337	BV	231.55440	1.87666e-1	43.45484		FDCA
11.521	VB	38.49753	8.81123e-2	3.39211		Furfural

Fig. S66 Reaction conditions: Cellulose (162 mg), C-HCl (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 12 h

Data File D:\DATA\20... 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 84.D
Sample Name: THD 84

Acq. Operator	: SYSTEM	Seq. Line	: 26
Acq. Instrument	: HPLC-DAD	Location	: P1-C-04
Injection Date	: 12/26/2021 9:55:35 PM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

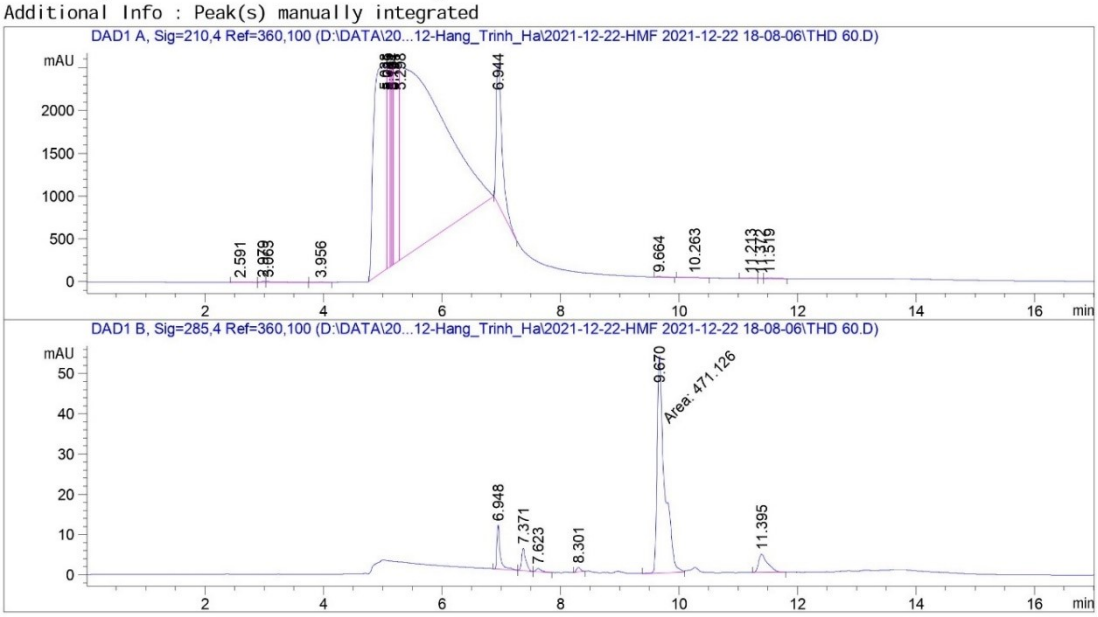
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.854	MM	1.06225e4	9.61189e-3	102.10219		HMF
10.579	BV	67.33325	1.51960e-2	1.02319		DFF
11.240	BB	3.29206	0.00000	0.00000		FDCA

Fig. S67 Reaction conditions: Cellulose (162 mg), C-HCl (8 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 60.D
Sample Name: THD 60

Acq. Operator	: SYSTEM	Seq. Line	: 46
Acq. Instrument	: HPLC-DAD	Location	: P1-E-03
Injection Date	: 12/23/2021 7:43:51 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/23/2021 9:10:27 AM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/23/2021 9:09:06 AM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

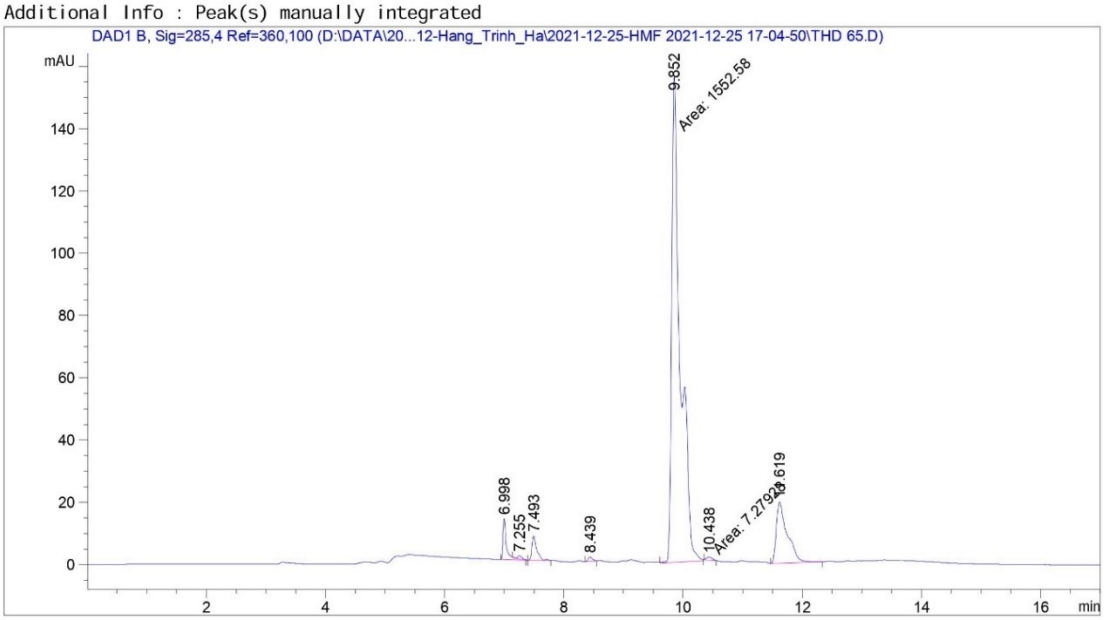
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.800		-	-	-		Levulinic acid
9.670	MM	471.12610	8.80348e-3	4.14755		HMF
10.401		-	-	-		DFF
11.097		-	-	-		FDCA

Fig. S68 Reaction conditions: Cellulose (162 mg), C-HCl (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 2 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 65.D
Sample Name: THD 65

```
Acq. Operator   : SYSTEM                          Seq. Line :  30
Acq. Instrument : HPLC-DAD                        Location :   P1-C-05
Injection Date  : 12/26/2021 1:50:01 AM                Inj :   1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900            -          -          -         Levulinic acid
  9.852 MM     1552.57837 9.39271e-3   14.58293    HMF
 10.438 MM        7.27928 5.47473e-2 3.98521e-1    DFF
 11.097            -          -          -         FDCA
 11.619 BB      250.41995 9.21766e-3    2.30829    Furfural

Totals :                               17.28973
```
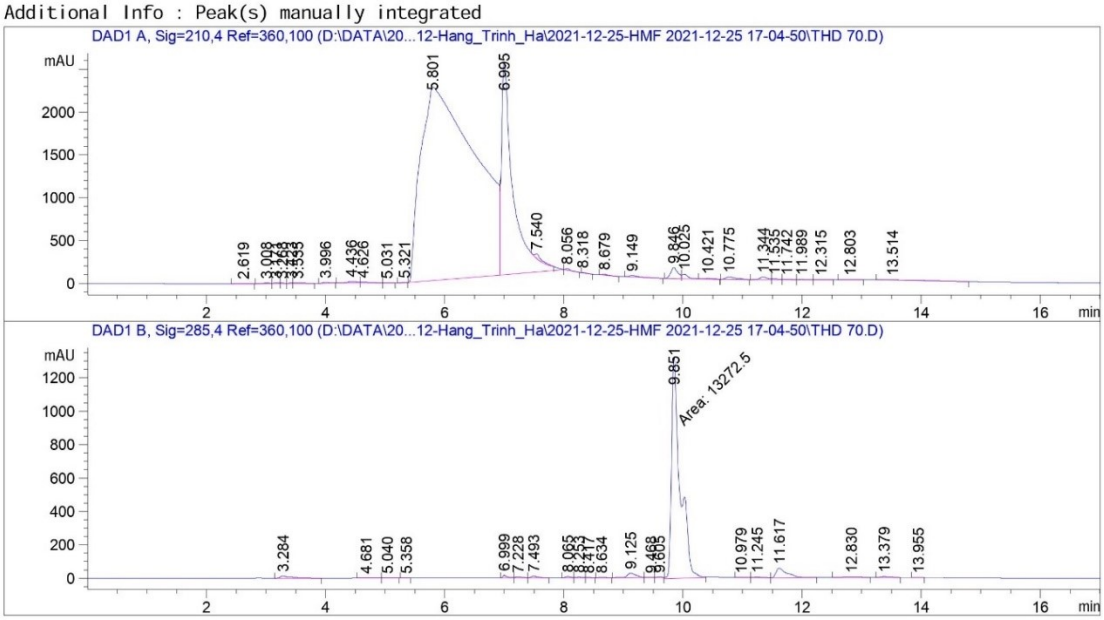


Fig. S69 Reaction conditions: Cellulose (162 mg), C-HCl (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 70.D
Sample Name: THD 70

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  35
Acq. Instrument : HPLC-DAD                       Location :  P1-D-01
Injection Date  : 12/26/2021 3:20:39 AM              Inj :  1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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==================================================================
                    External Standard Report
==================================================================

Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.851	MM	1.32725e4	9.61938e-3	127.67339		HMF
10.401		-	-	-		DFF
10.979	BV	14.55604	0.00000	0.00000		FDCA

Fig. S70 Reaction conditions: Cellulose (162 mg), C-HCl (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 8 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 75.D
Sample Name: THD 75

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  40
Acq. Instrument : HPLC-DAD                       Location :   P1-D-06
Injection Date  : 12/26/2021 4:51:16 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 12:02:08 AM by SYSTEM
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Additional Info : Peak(s) manually integrated
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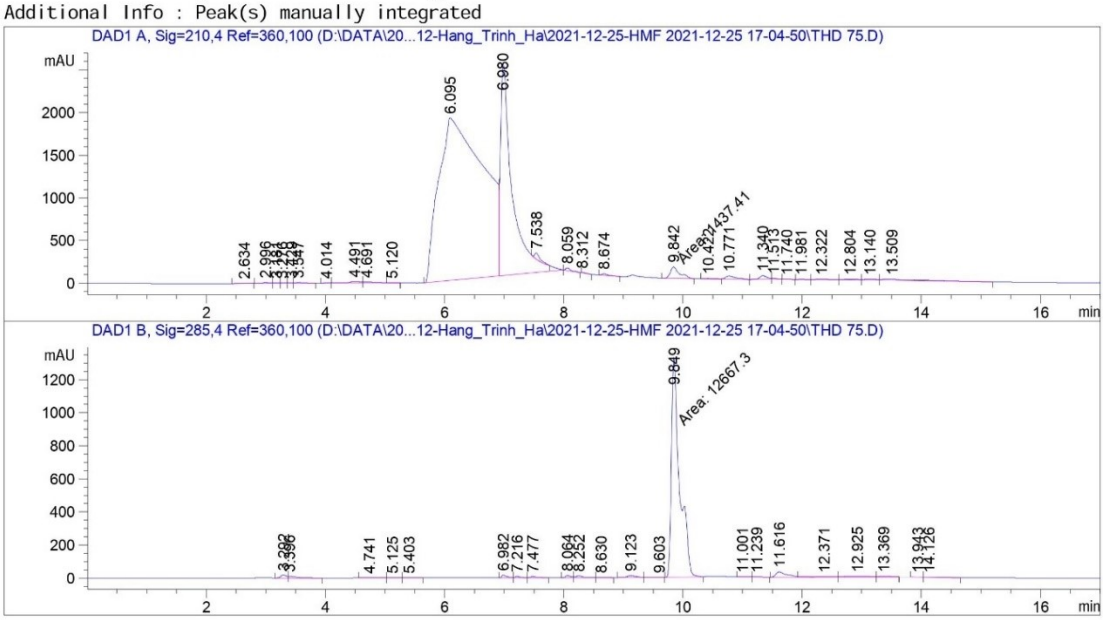


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======================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 12:02:08 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

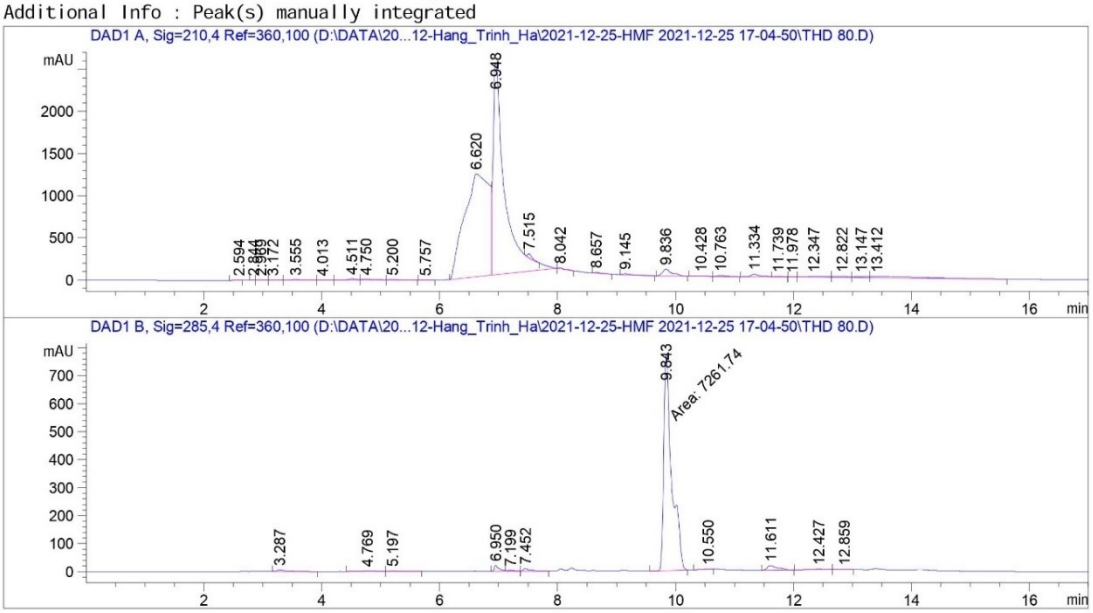
RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
4.014	BB	14.48118	1.65411	23.95351		Formic acid
9.100		-	-	-		Levulinic acid
9.842	MM	1437.41370	1.22796e-1	176.50887		HMF
10.422	BV E	42.80061	5.33376e-3	2.28288e-1		DFF
11.340	BV	385.93423	1.93189e-1	74.55824		FDCA
11.513	VB	71.98994	9.66458e-2	6.95752		Furfural

Fig. S71 Reaction conditions: Cellulose (162 mg), C-HCl (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 12 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 80.D
Sample Name: THD 80

Acq. Operator	: SYSTEM	Seq. Line	: 45
Acq. Instrument	: HPLC-DAD	Location	: P1-E-02
Injection Date	: 12/26/2021 6:21:39 AM	Inj	: 1
		Inj Volume	: 10.000 µl

Acq. Method : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\HMF_cot 150_hat nho.M
Last changed : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed : 12/30/2021 3:25:52 AM by SYSTEM
(modified after loading)
Additional Info : Peak(s) manually integrated



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/30/2021 3:26:25 AM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

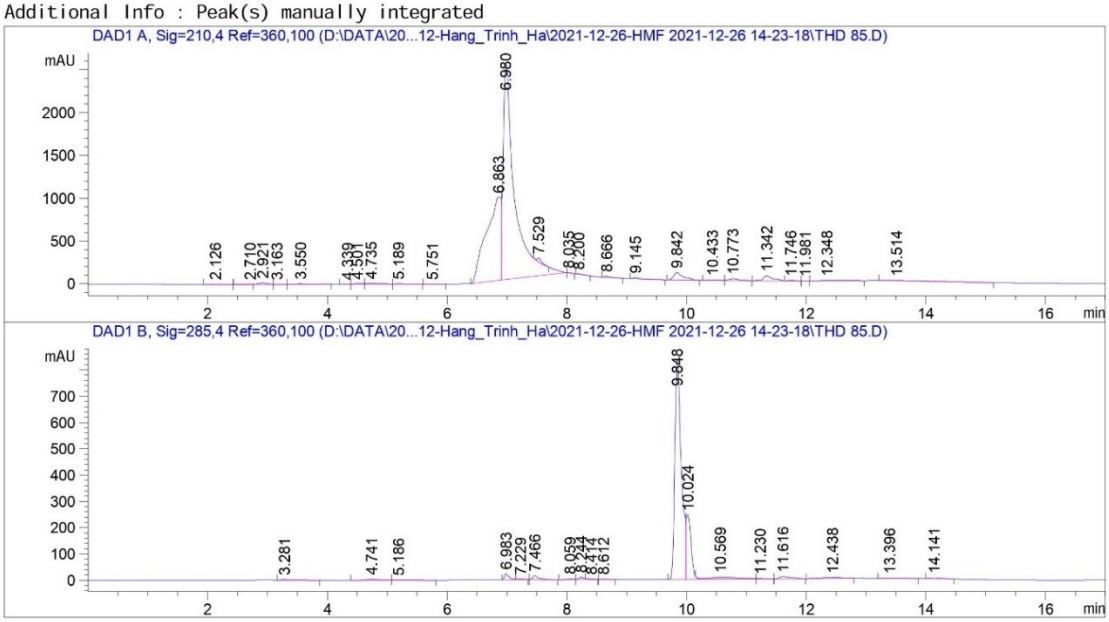
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.843	MM	7261.73975	9.59453e-3	69.67296		HMF
10.550	BB	12.91121	3.54036e-2	4.57103e-1		DFF

Fig. S72 Reaction conditions: Cellulose (162 mg), C-HCl (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20... 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 85.D
Sample Name: THD 85

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  27
Acq. Instrument : HPLC-DAD                       Location :  P1-C-05
Injection Date  : 12/26/2021 10:13:40 PM             Inj :  1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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==================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900            -          -          -         Levulinic acid
  9.848 BV     6305.29443 9.58620e-3   60.44383    HMF
 10.569 VV E    247.70139 1.17051e-2    2.89936    DFF
 11.230 VB E     11.51327    0.00000    0.00000    FDCA
```


Fig. S73 Reaction conditions: Cellulose (162 mg), C-HCl (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 66.D
Sample Name: THD 66

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  31
Acq. Instrument : HPLC-DAD                       Location :  P1-C-06
Injection Date  : 12/26/2021 2:08:06 AM              Inj :  1
                                                 Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/29/2021 10:45:12 PM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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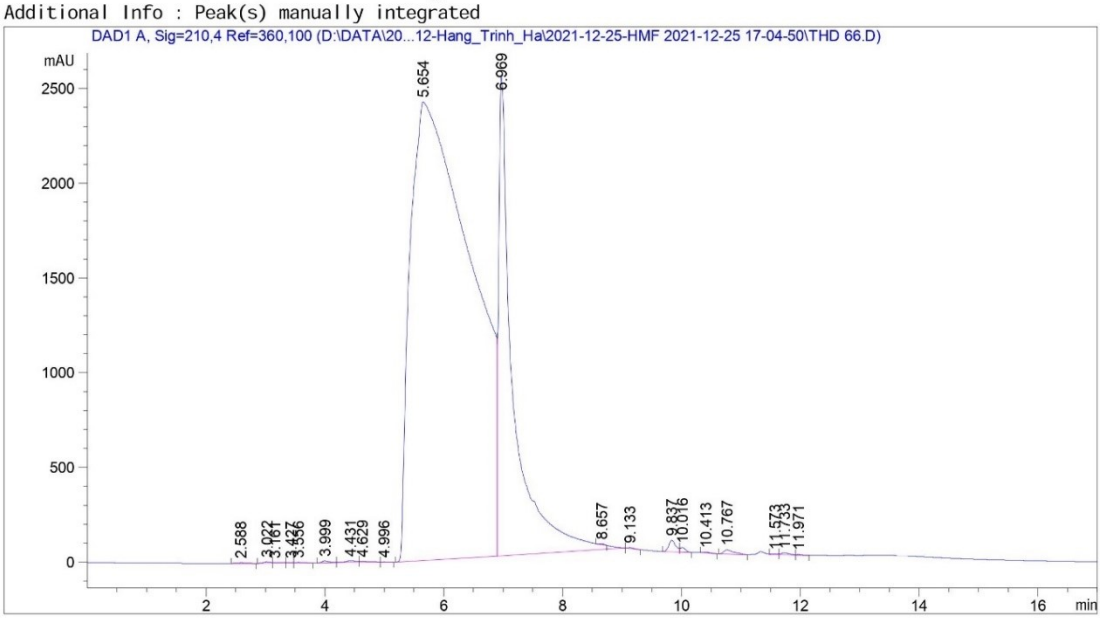


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==================================================================
                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:44:42 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```
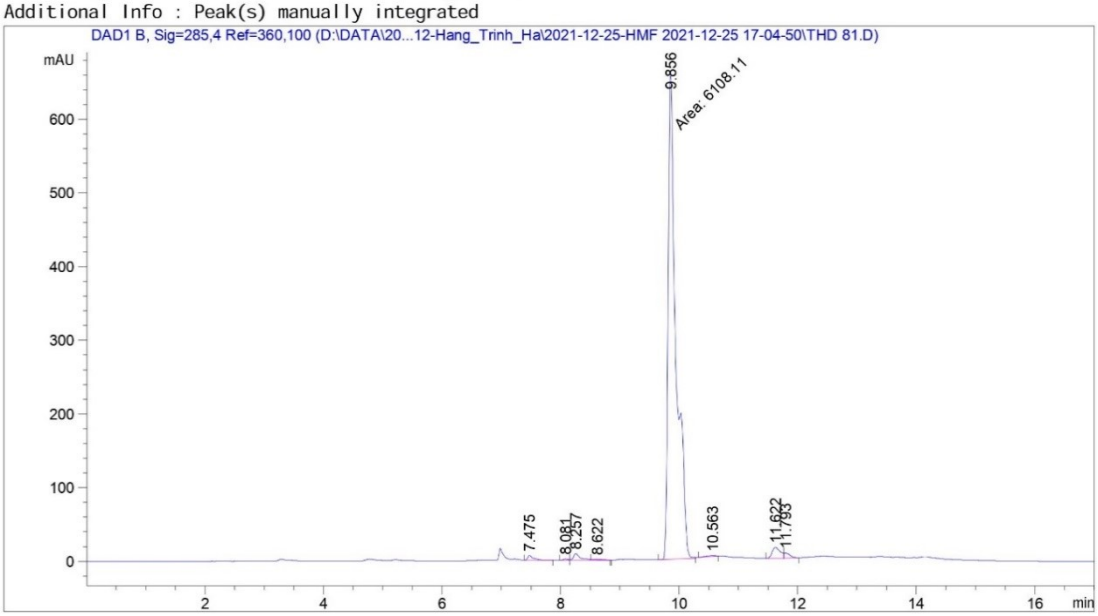

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.999	BV	91.19791	1.33533	121.77894		Formic acid
8.900		-	-	-		Levulinic acid
9.837	BV	499.71005	1.20966e-1	60.44786		HMF
10.413	BB	32.55491	0.00000	0.00000		DFF
11.400		-	-	-		FDCA
11.573	VV	51.27386	9.26828e-2	4.75221		Furfural

Fig. S74 Reaction conditions: Cellulose (162 mg), C-HCl (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 4 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 81.D
Sample Name: THD 81

Acq. Operator	: SYSTEM	Seq. Line	: 46
Acq. Instrument	: HPLC-DAD	Location	: P1-E-03
Injection Date	: 12/26/2021 6:39:42 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.856	MM	6108.10693	9.58416e-3	58.54108		HMF
10.563	BB	11.91111	3.75028e-2	4.46700e-1		DFF
11.097		-	-	-		FDCA
11.622	BV	141.66512	8.45163e-3	1.19730		Furfural
Totals :				60.18509		

Fig. S75 Reaction conditions: Cellulose (162 mg), C-HCl (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 12 h

Data File D:\DATA\20... 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-50\THD 76.D
Sample Name: THD 76

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  41
Acq. Instrument : HPLC-DAD                      Location :   P1-D-07
Injection Date  : 12/26/2021 5:09:20 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\25-12-Hang_Trinh_Ha\2021-12-25-HMF 2021-12-25 17-04-
                  50\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/30/2021 12:02:08 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
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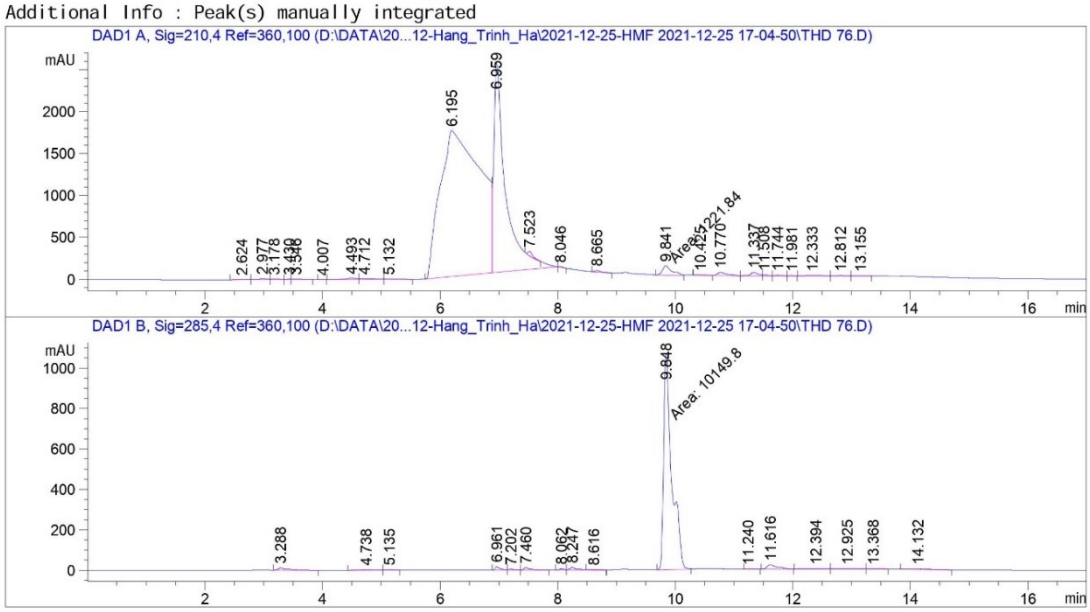


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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/30/2021 12:02:52 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```
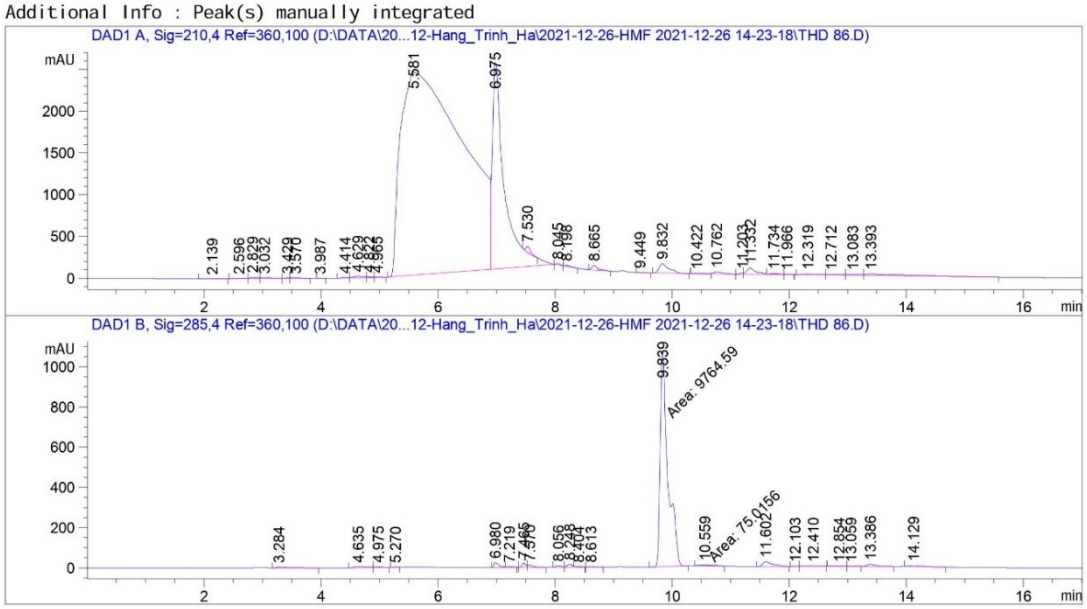

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
4.007	BB	4.01500	2.64198	10.60755		Formic acid
9.100		-	-	-		Levulinic acid
9.841	MM	1221.83801	1.22624e-1	149.82674		HMF
10.425	BV E	36.67812	0.00000	0.00000		DFF
11.337	BV	369.08209	1.92811e-1	71.16299		FDCA
11.508	VV	69.26036	9.62592e-2	6.66695		Furfural

Fig. S76 Reaction conditions: Cellulose (162 mg), C-HCl (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 18 h

Data File D:\DATA\20... 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-18\THD 86.D
Sample Name: THD 86

```
==================================================================
Acq. Operator   : SYSTEM                       Seq. Line :  28
Acq. Instrument : HPLC-DAD                     Location :   P1-C-06
Injection Date  : 12/26/2021 10:31:43 PM            Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\26-12-Hang_Trinh_Ha\2021-12-26-HMF 2021-12-26 14-23-
                  18\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.839	MM	9764.59180	9.60859e-3	93.82400		HMF
10.559	MM	75.01559	1.47050e-2	1.10310		DFF
11.097		-	-	-		FDCA

Fig. S77 Reaction conditions: Cellulose (162 mg), C-HCl (20 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-33\THD 20.D
Sample Name: THD 20

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  43
Acq. Instrument : HPLC-DAD                        Location :   P1-D-08
Injection Date  : 12/20/2021 4:35:58 AM                Inj :   1
                                                  Inj Volume : 10.000 µl
Different Inj Volume from Sample Entry!  Actual Inj Volume : 5.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-
                  33\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
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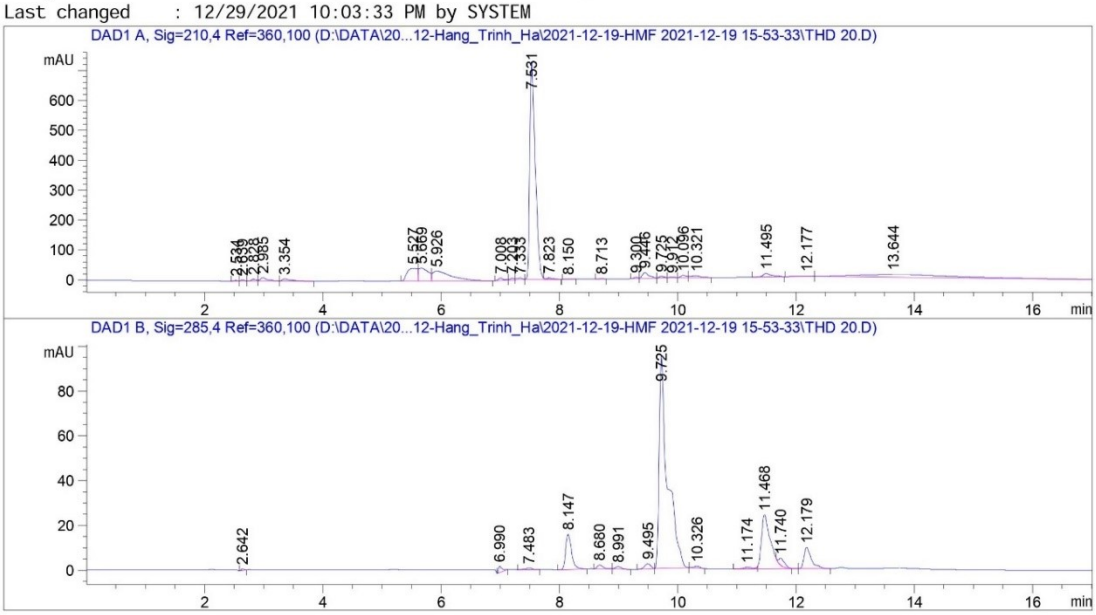


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======================================================================
                    External Standard Report
======================================================================

Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

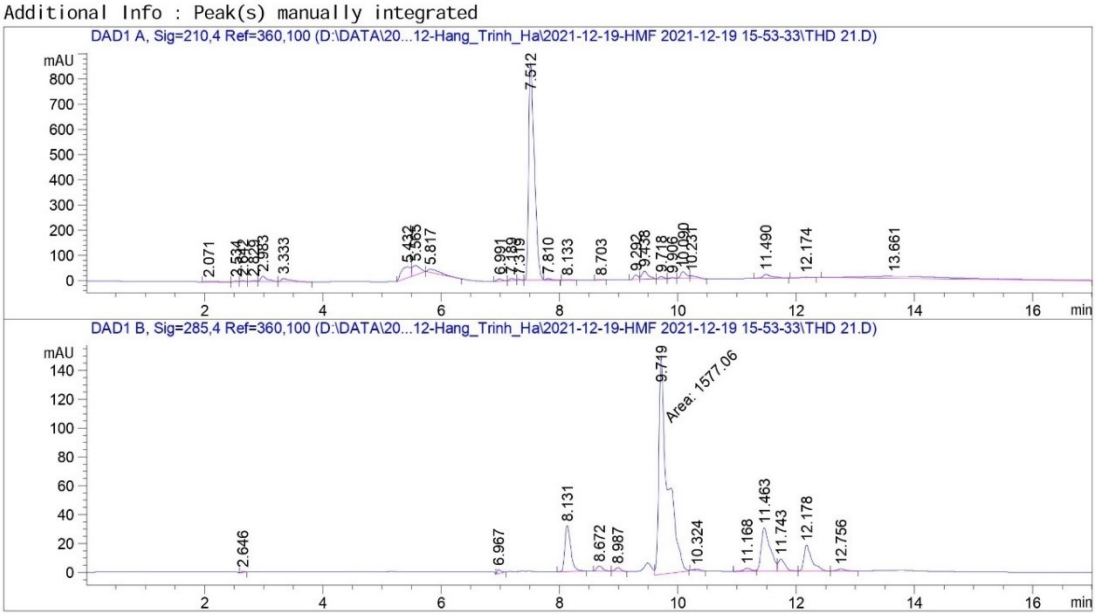

Signal 2: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.991	VB	8.16062	20.20872	164.91576		Levulinic acid
9.725	VB	940.83545	9.22581e-3	8.67997		HMF
10.326	BB	5.83982	6.56780e-2	3.83548e-1		DFF
11.174	BV E	8.00892	0.00000	0.00000		FDCA

Fig. S78 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), DES-C (4 g), 120 °C, 18 h

Data File D:\DATA\20... 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-33\THD 21.D
Sample Name: THD 21

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  44
Acq. Instrument : HPLC-DAD                       Location :   P1-D-09
Injection Date  : 12/20/2021 4:54:00 AM               Inj :   1
                                                 Inj Volume : 10.000 µl
Different Inj Volume from Sample Entry!  Actual Inj Volume : 5.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-
                  33\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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======================================================================
                      External Standard Report
======================================================================

Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.987 VB       16.27456   19.48703  317.14291    Levulinic acid
  9.719 MM     1577.06274 9.39670e-3   14.81919    HMF
 10.324 BB        5.96676 6.45020e-2 3.84868e-1    DFF
```


Fig. S79 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), DES-O (4 g), 120 °C, 18 h

Data File D:\DATA\20... 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-33\THD 22.D
Sample Name: THD 22

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  45
Acq. Instrument : HPLC-DAD                      Location :   P1-E-01
Injection Date  : 12/20/2021 5:12:16 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-
                  33\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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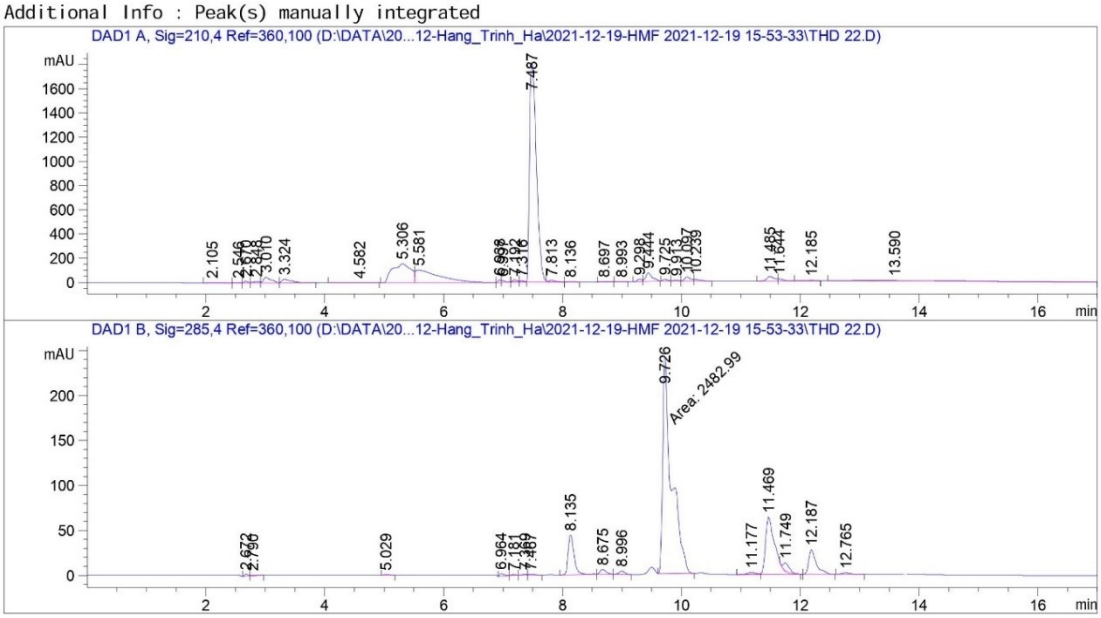


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==================================================================
                      External Standard Report
==================================================================

Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100
```
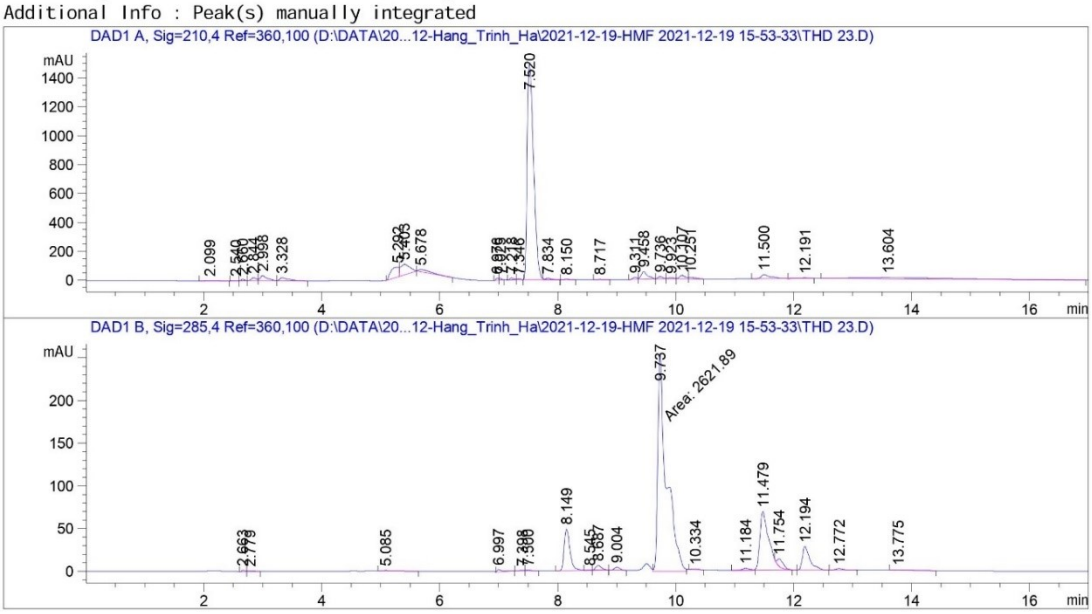

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.996	BB	22.91698	19.27665	441.76272		Levulinic acid
9.726	MM	2482.99048	9.48890e-3	23.56085		HMF
10.401		-	-	-		DFF
11.177	BV E	21.16860	0.00000	0.00000		FDCA

Fig. S80 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), DES-M (4 g), 120 °C, 18 h

Data File D:\DATA\20... 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-33\THD 23.D
Sample Name: THD 23

```
==================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  46
Acq. Instrument : HPLC-DAD                          Location :  P1-E-02
Injection Date  : 12/20/2021 5:30:20 AM                Inj :  1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-
                  33\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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==================================================================
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
9.004	BB	21.34094	19.31472	412.19428		Levulinic acid
9.737	MM	2621.89331	9.49741e-3	24.90118		HMF
10.334	BB	5.83191	6.57530e-2	3.83465e-1		DFF
11.184	BV E	20.75304	0.00000	0.00000		FDCA

Fig. S81 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), DES-F (4 g), 120 °C, 18 h

Data File D:\DATA\20... 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-33\THD 23.D
Sample Name: THD 23

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  46
Acq. Instrument : HPLC-DAD                      Location :   P1-E-02
Injection Date  : 12/20/2021 5:30:20 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\19-12-Hang_Trinh_Ha\2021-12-19-HMF 2021-12-19 15-53-
                  33\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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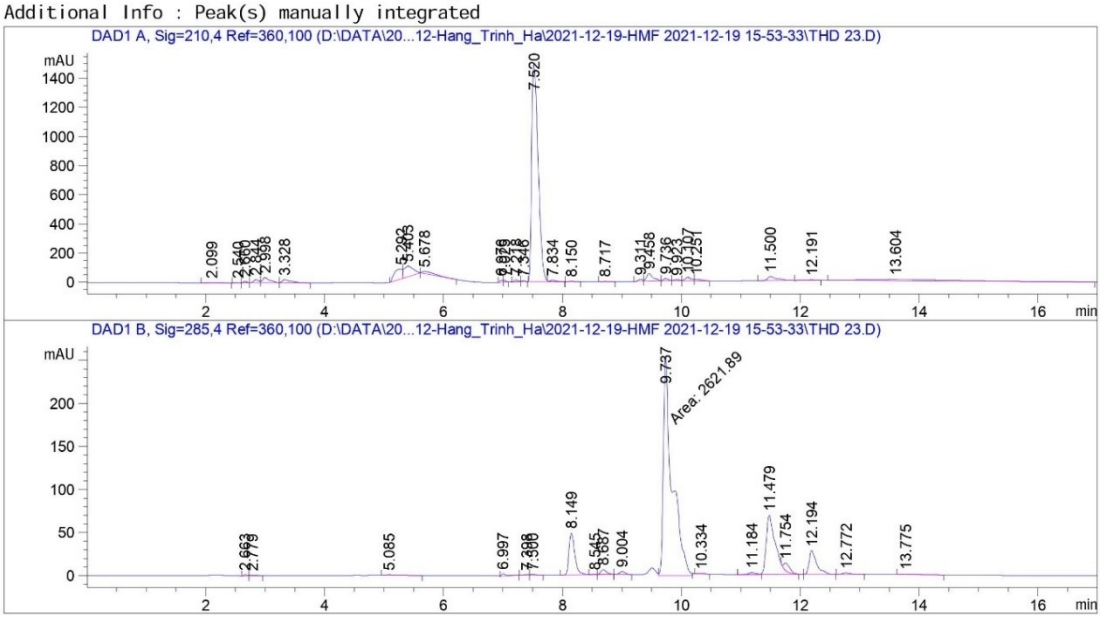


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

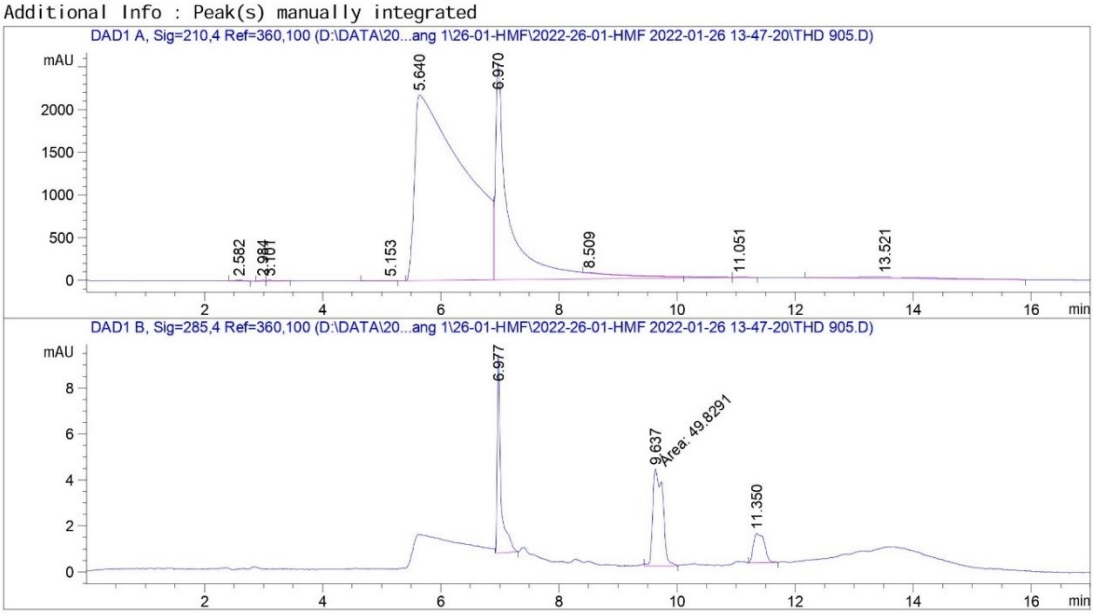

Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                 [ppm]
-------|------|----------|----------|----------|--|------------------
  9.004 BB       21.34094   19.31472  412.19428    Levulinic acid
  9.737 MM     2621.89331 9.49741e-3   24.90118    HMF
 10.334 BB        5.83191 6.57530e-2 3.83465e-1    DFF
 11.184 BV E     20.75304    0.00000    0.00000    FDCA
```


Fig. S82 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), DES-A (4 g), 120 °C, 18 h

Data File D:\DATA\2022\Thang 1\26-01-HMF\2022-26-01-HMF 2022-01-26 13-47-20\THD 905.D
Sample Name: THD 905

Acq. Operator	: SYSTEM	Seq. Line	: 27
Acq. Instrument	: HPLC-DAD	Location	: P1-C-04
Injection Date	: 1/26/2022 9:37:07 PM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2022\Thang 1\26-01-HMF\2022-26-01-HMF 2022-01-26 13-47-20\HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

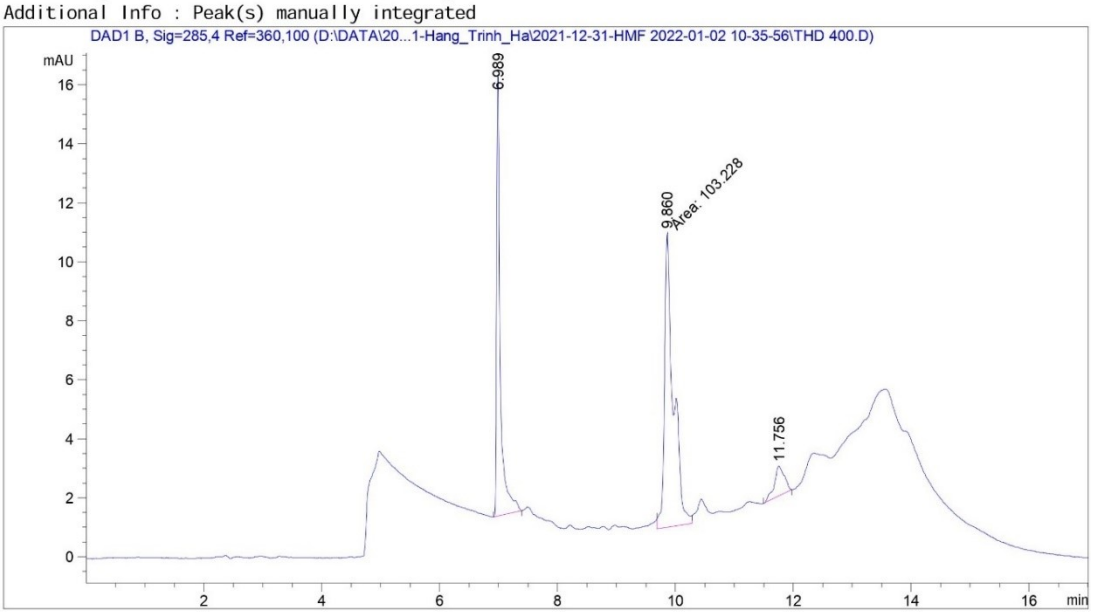
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.637	MM	49.82907	1.65129e-3	8.22823e-2		HMF
10.401		-	-	-		DFF
11.097		-	-	-		FDCA

Fig. S83 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 80 °C, 24 h

Data File D:\DATA\20... 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56\THD 400.D
Sample Name: THD 400

Acq. Operator	: SYSTEM	Seq. Line	: 32
Acq. Instrument	: HPLC-DAD	Location	: P1-D-01
Injection Date	: 1/2/2022 7:57:42 PM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2022\Thang 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56 \HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

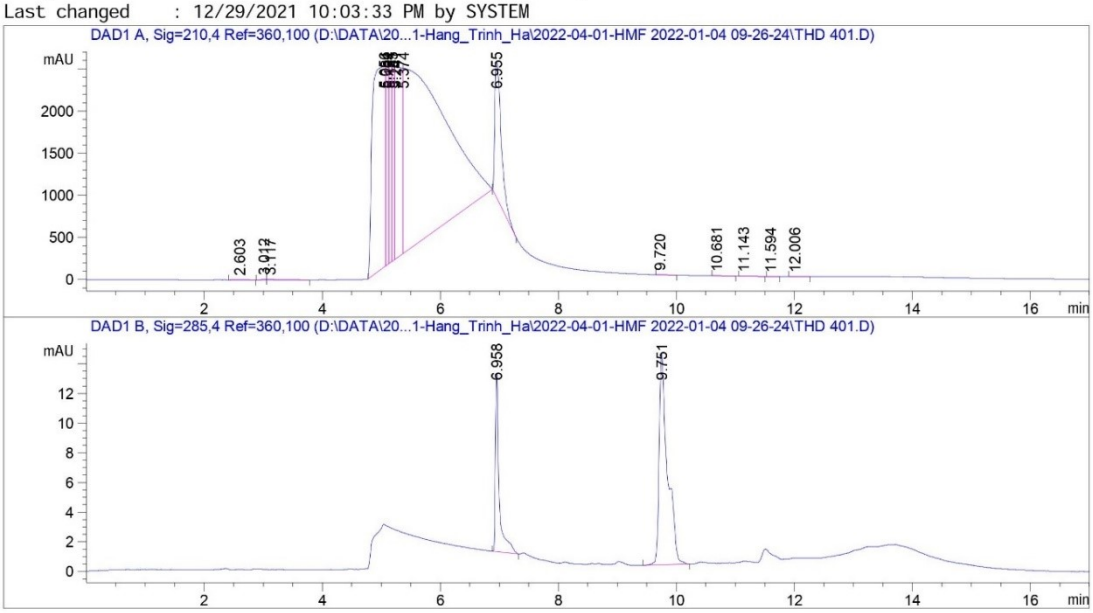
Signal 1: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.860	MM	103.22765	5.78863e-3	5.97547e-1		HMF
10.401		-	-	-		DFF
11.097		-	-	-		FDCA
11.400		-	-	-		Furfural
Totals :				5.97547e-1		

Fig. S84 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 100 °C, 2 h

Data File D:\DATA\20... 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24\THD 401.D
Sample Name: THD 401

Acq. Operator	: SYSTEM	Seq. Line	: 53
Acq. Instrument	: HPLC-DAD	Location	: P1-F-09
Injection Date	: 1/5/2022 1:07:35 AM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2022\Thang 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24 \HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100

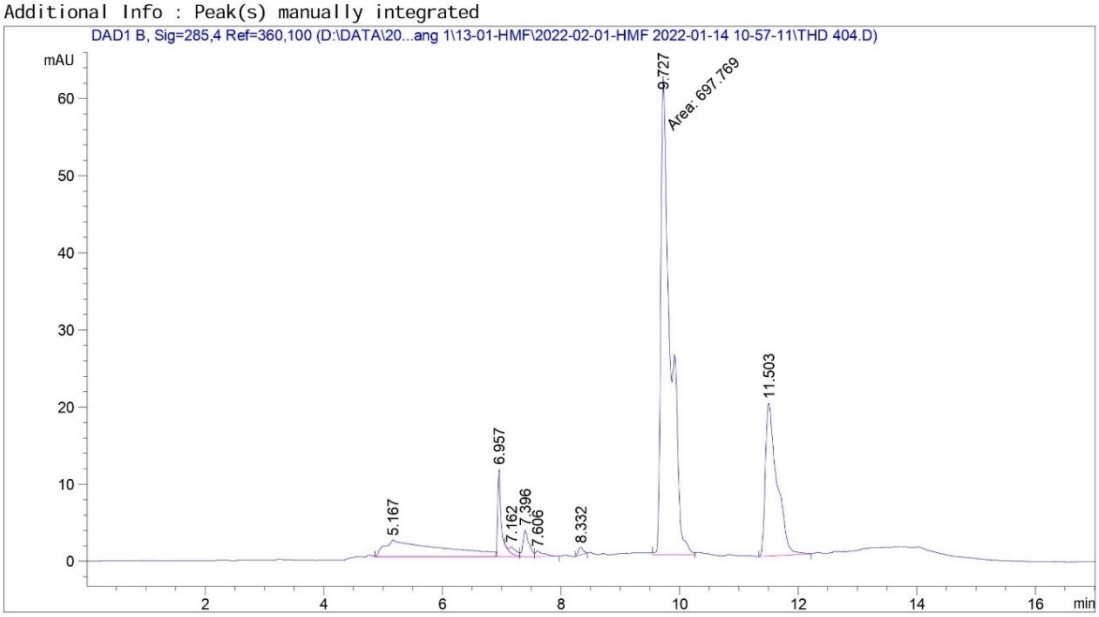
Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.751	BB	140.46152	6.81206e-3	9.56832e-1		HMF
10.401		-	-	-		DFF
11.097		-	-	-		FDCA
11.400		-	-	-		Furfural

Fig. S85 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 100 °C, 4 h

Data File D:\DATA\2022\Thang 1\13-01-HMF\2022-02-01-HMF 2022-01-14 10-57-11\THD 404.D
Sample Name: THD 404

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :   4
Acq. Instrument : HPLC-DAD                      Location :   P1-F-03
Injection Date  : 1/14/2022 11:52:14 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\13-01-HMF\2022-02-01-HMF 2022-01-14 10-57-11\HMF_cot
                  150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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==================================================================
                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```
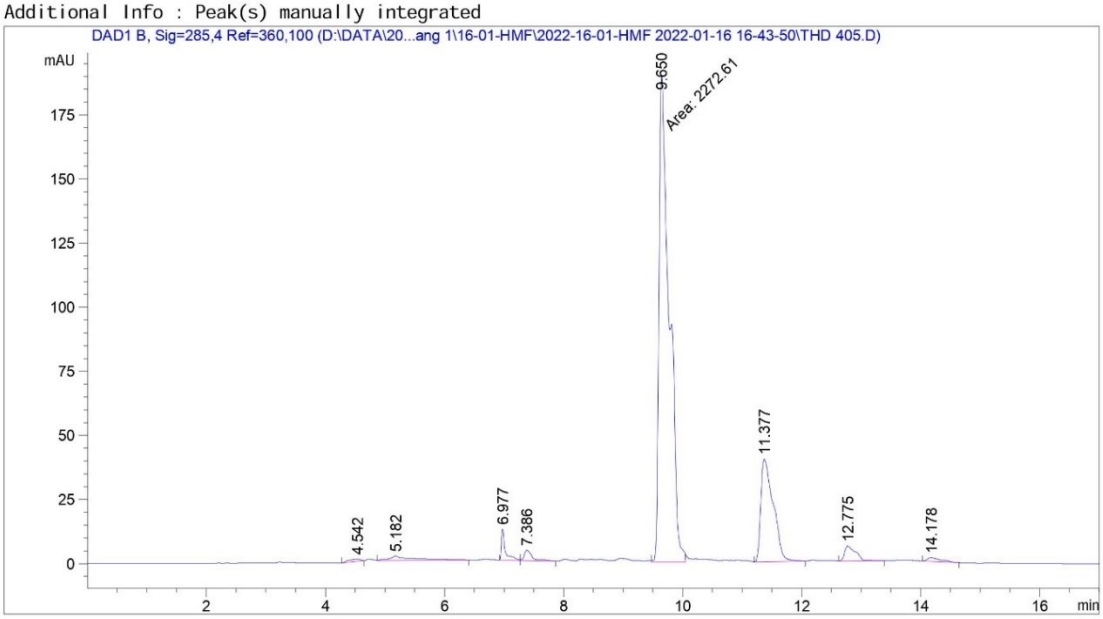

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.727	MM	697.76898	9.07825e-3	6.33452		HMF
10.401		-	-	-		DFF
11.097		-	-	-		FDCA
11.503	BB	269.86777	9.28957e-3	2.50696		Furfural
Totals :				8.84147		

Fig. S86 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 100 °C, 8 h

Data File D:\DATA\2022\Thang 1\16-01-HMF\2022-16-01-HMF 2022-01-16 16-43-50\THD 405.D
Sample Name: THD 405

```
======================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  15
Acq. Instrument : HPLC-DAD                        Location :   P1-B-01
Injection Date  : 1/16/2022 8:56:43 PM                 Inj :   1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\16-01-HMF\2022-16-01-HMF 2022-01-16 16-43-50\HMF_cot
                  150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.650	MM	2272.60791	9.47404e-3	21.53078		HMF
10.401		-	-	-		DFF
11.097		-	-	-		FDCA
11.377	BB	579.27551	9.78413e-3	5.66771		Furfural

Totals : 27.19849

Fig. S87 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 100 °C, 18 h

Data File D:\DATA\20... 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24\THD 403.D
Sample Name: THD 403

```
==================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  55
Acq. Instrument : HPLC-DAD                      Location :   P1-A-03
Injection Date  : 1/5/2022 1:43:45 AM                Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24
                  \HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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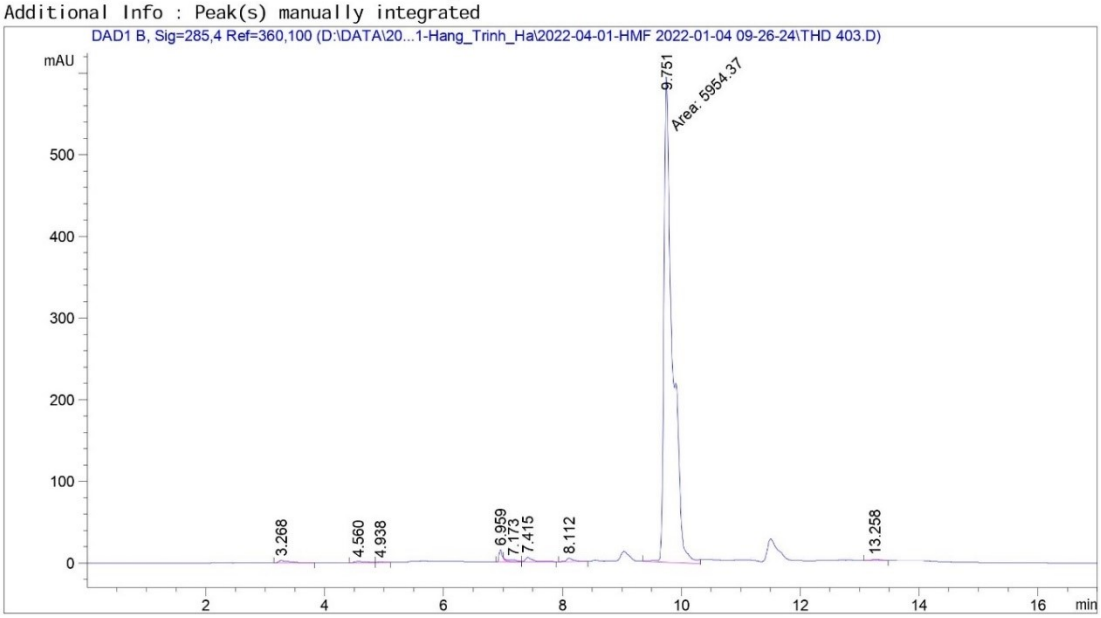


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```

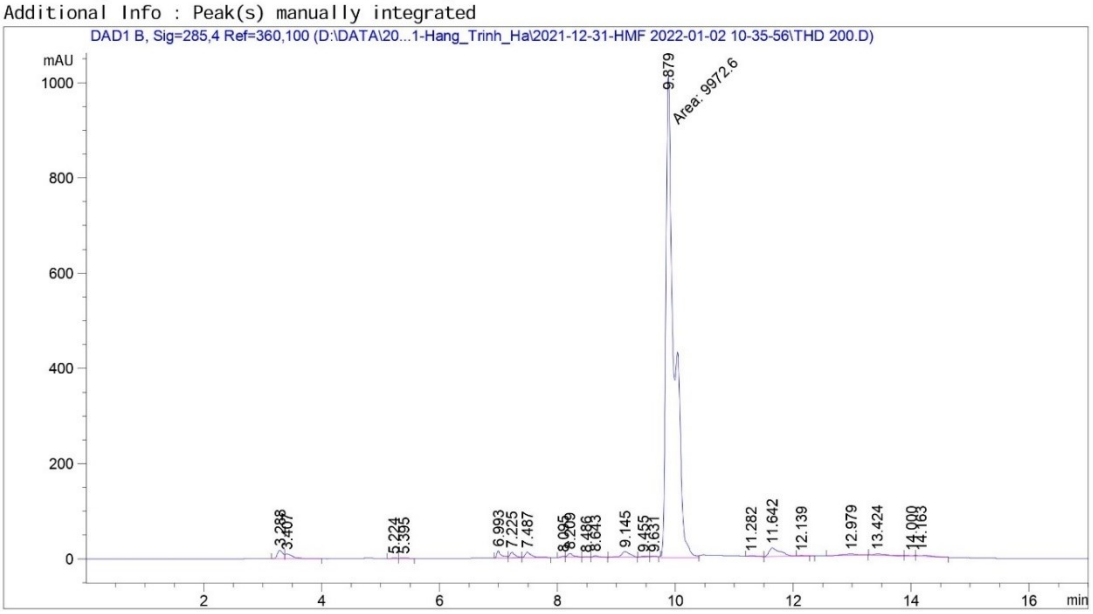
RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.751	MM	5954.37012	9.58248e-3	57.05762		HMF
10.401		-	-	-		DFF
11.097		-	-	-		FDCA
11.400		-	-	-		Furfural

Totals : 57.05762

Fig. S88 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 100 °C, 24 h

Data File D:\DATA\20... 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56\THD 200.D
Sample Name: THD 200

Acq. Operator	: SYSTEM	Seq. Line	: 31
Acq. Instrument	: HPLC-DAD	Location	: P1-C-09
Injection Date	: 1/2/2022 7:39:36 PM	Inj	: 1
		Inj Volume	: 10.000 µl
Acq. Method	: D:\DATA\2022\Thang 1\02-01-Hang_Trinh_Ha\2021-12-31-HMF 2022-01-02 10-35-56 \HMF_cot 150_hat nho.M		
Last changed	: 11/30/2021 8:55:26 PM by SYSTEM		
Analysis Method	: D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M		
Last changed	: 12/29/2021 10:03:33 PM by SYSTEM		
Additional Info	: Peak(s) manually integrated		



External Standard Report

Sorted By : Signal
Calib. Data Modified : 12/29/2021 10:00:38 PM
Multiplier : 1.0000
Dilution : 1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.879	MM	9972.60449	9.60945e-3	95.83120		HMF
10.401		-	-	-		DFF
11.097		-	-	-		FDCA
11.282	BB	15.24448	0.00000	0.00000		Furfural
Totals :				95.83120		

Fig. S89 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 140 °C, 2 h

Data File D:\DATA\20... 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24\THD 201.D
Sample Name: THD 201

```
======================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  50
Acq. Instrument : HPLC-DAD                     Location :   P1-F-06
Injection Date  : 1/5/2022 12:13:24 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24
                  \HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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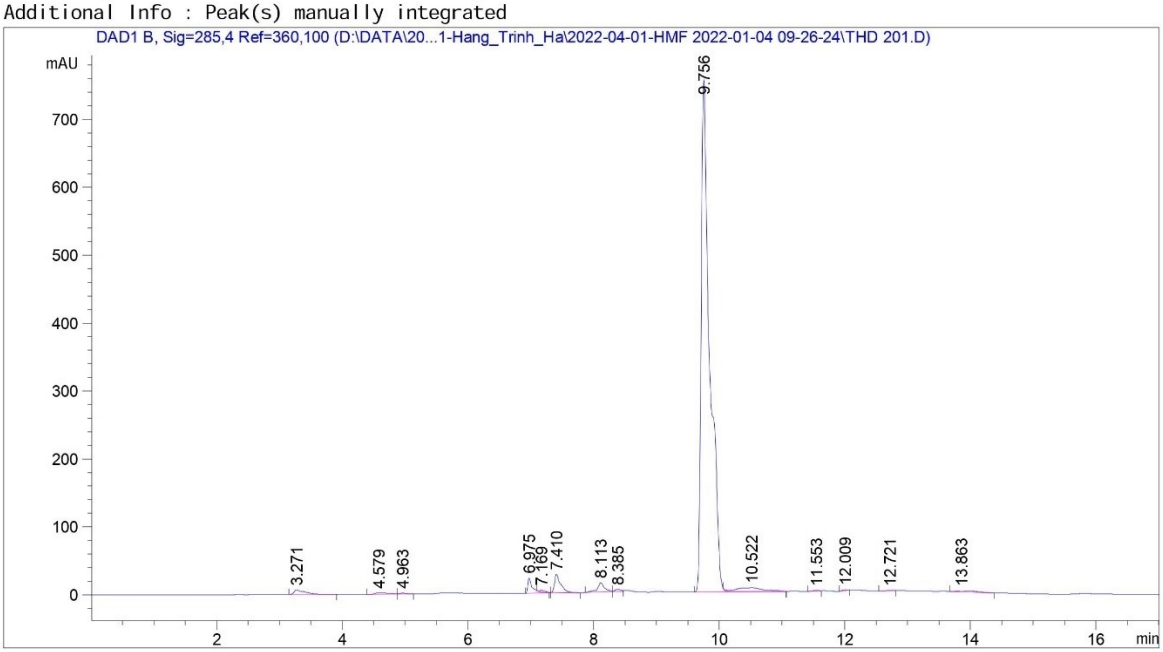


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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.756	BV R	7143.93262	9.59362e-3	68.53619		HMF
10.522	VB E	178.90971	1.22061e-2	2.18380		DFF
11.097		-	-	-		FDCA
11.553	BB	5.15884	0.00000	0.00000		Furfural
Totals :				70.71999		

Fig. S90 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 140 °C, 4 h

Data File D:\DATA\20... 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24\THD 202.D
Sample Name: THD 202

```
==================================================================
Acq. Operator   : SYSTEM                       Seq. Line :  51
Acq. Instrument : HPLC-DAD                     Location :   P1-F-07
Injection Date  : 1/5/2022 12:31:28 AM              Inj :   1
                                              Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24
                  \HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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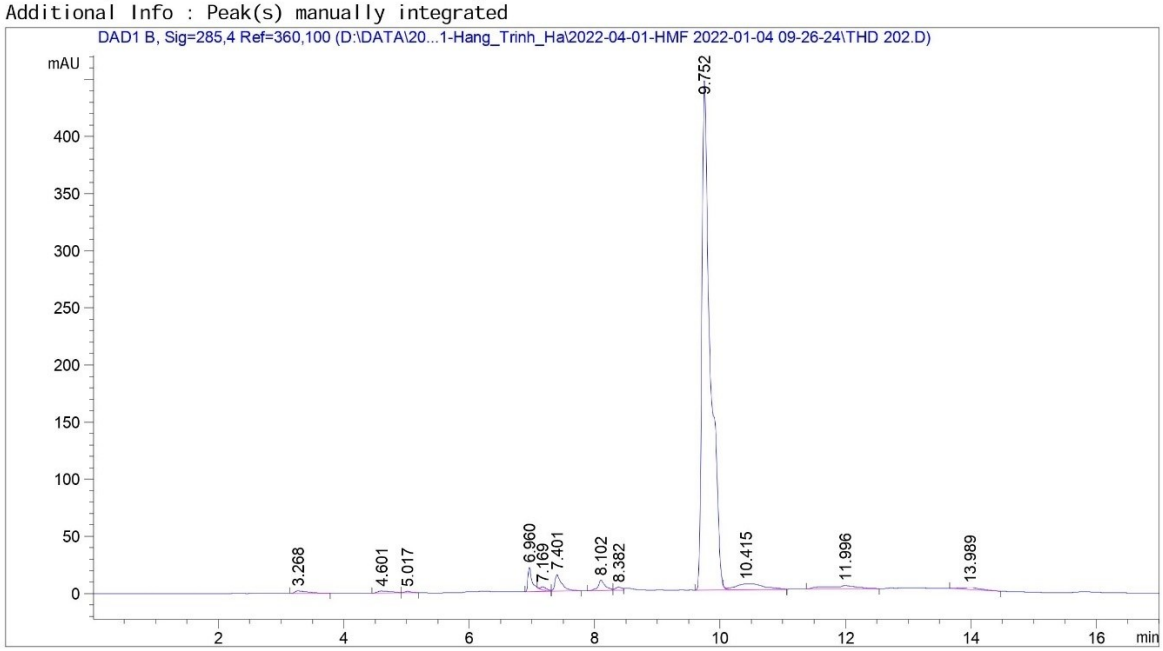


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                      External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
8.900		-	-	-		Levulinic acid
9.752	BV R	4217.78271	9.55492e-3	40.30057		HMF
10.415	VB E	154.10184	1.24966e-2	1.92575		DFF
11.097		-	-	-		FDCA
11.400		-	-	-		Furfural
Totals :				42.22632		

Fig. S91 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 140 °C, 8 h

Data File D:\DATA\2022\Thang 1\13-01-HMF\2022-02-01-HMF 2022-01-14 10-57-11\THD 205.D
Sample Name: THD 205

```
======================================================================
Acq. Operator   : SYSTEM                       Seq. Line :   3
Acq. Instrument : HPLC-DAD                     Location :   P1-F-02
Injection Date  : 1/14/2022 11:34:12 AM            Inj :   1
                                             Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\13-01-HMF\2022-02-01-HMF 2022-01-14 10-57-11\HMF_cot
                  150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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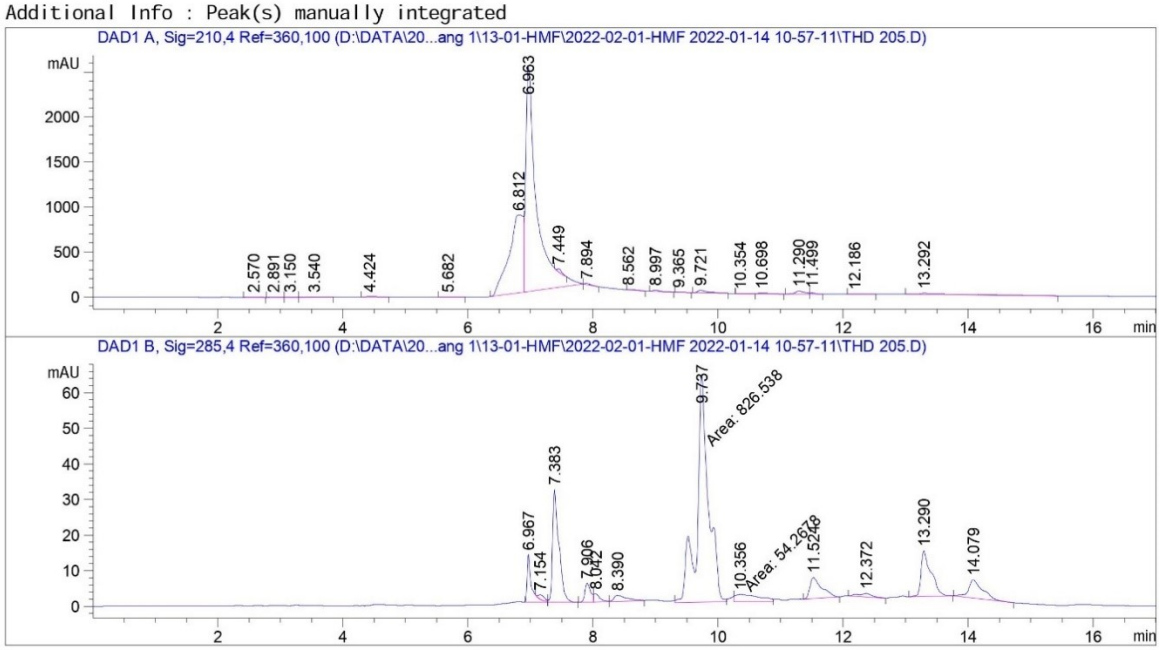


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                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100


Signal 2: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900           -          -          -         Levulinic acid
  9.737 MM      826.53815 9.16723e-3    7.57707    HMF
 10.356 MM       54.26775 1.63502e-2 8.87288e-1    DFF
 11.097           -          -          -         FDCA
```


Fig. S92 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 140 °C, 18 h

Data File D:\DATA\20... 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24\THD 203.D
Sample Name: THD 203

```
==========================================================================
Acq. Operator   : SYSTEM                          Seq. Line :  52
Acq. Instrument : HPLC-DAD                        Location :   P1-F-08
Injection Date  : 1/5/2022 12:49:32 AM                 Inj :   1
                                                  Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2022\Thang 1\03-01-Hang_Trinh_Ha\2022-04-01-HMF 2022-01-04 09-26-24
                  \HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_285nmKQ.M
Last changed    : 12/29/2021 10:03:33 PM by SYSTEM
Additional Info : Peak(s) manually integrated
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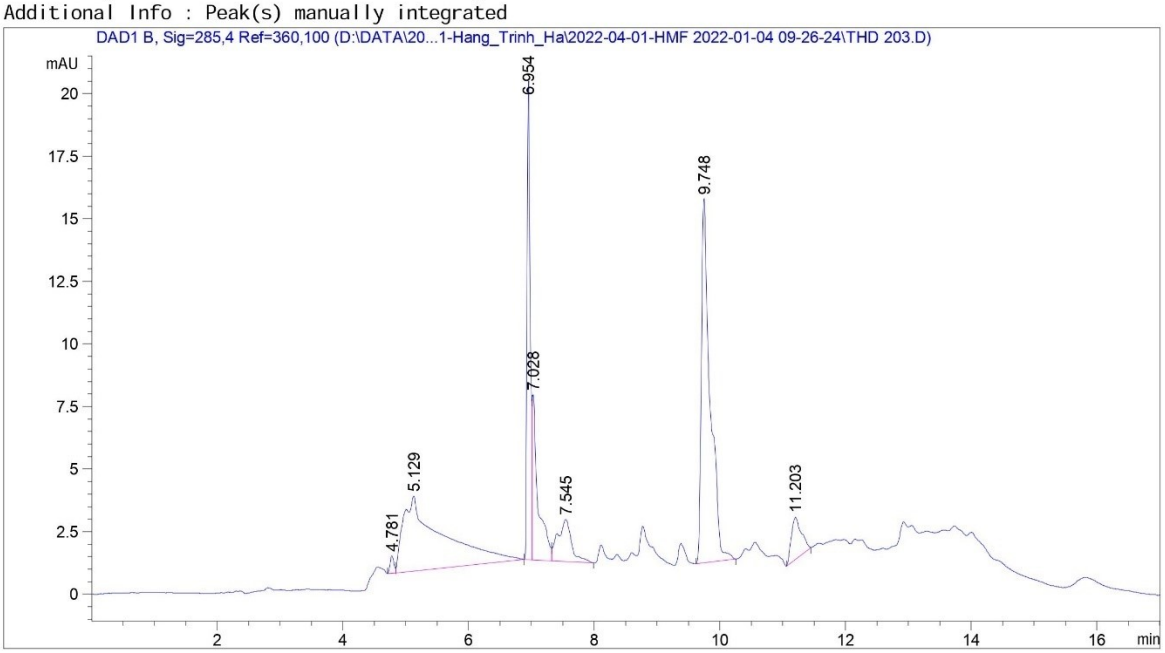


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==========================================================================
                      External Standard Report
==========================================================================

Sorted By             :      Signal
Calib. Data Modified  :      12/29/2021 10:00:38 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 B, Sig=285,4 Ref=360,100

RetTime  Type     Area      Amt/Area    Amount   Grp   Name
 [min]          [mAU*s]                 [ppm]
-------|------|----------|----------|----------|--|------------------
  8.900           -          -          -         Levulinic acid
  9.748 BB      140.04756 6.80367e-3 9.52837e-1    HMF
 10.401           -          -          -         DFF
 11.203 BB       18.58884    0.00000    0.00000    FDCA
 11.400           -          -          -         Furfural

Totals :                             9.52837e-1
```


Fig. S93 Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 140 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 49.D
Sample Name: THD 49

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======================================================================
Acq. Operator   : SYSTEM                        Seq. Line :  35
Acq. Instrument : HPLC-DAD                      Location :   P1-D-01
Injection Date  : 12/23/2021 4:24:32 AM              Inj :   1
                                               Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/24/2021 12:53:59 PM by SYSTEM
Additional Info : Peak(s) manually integrated
```

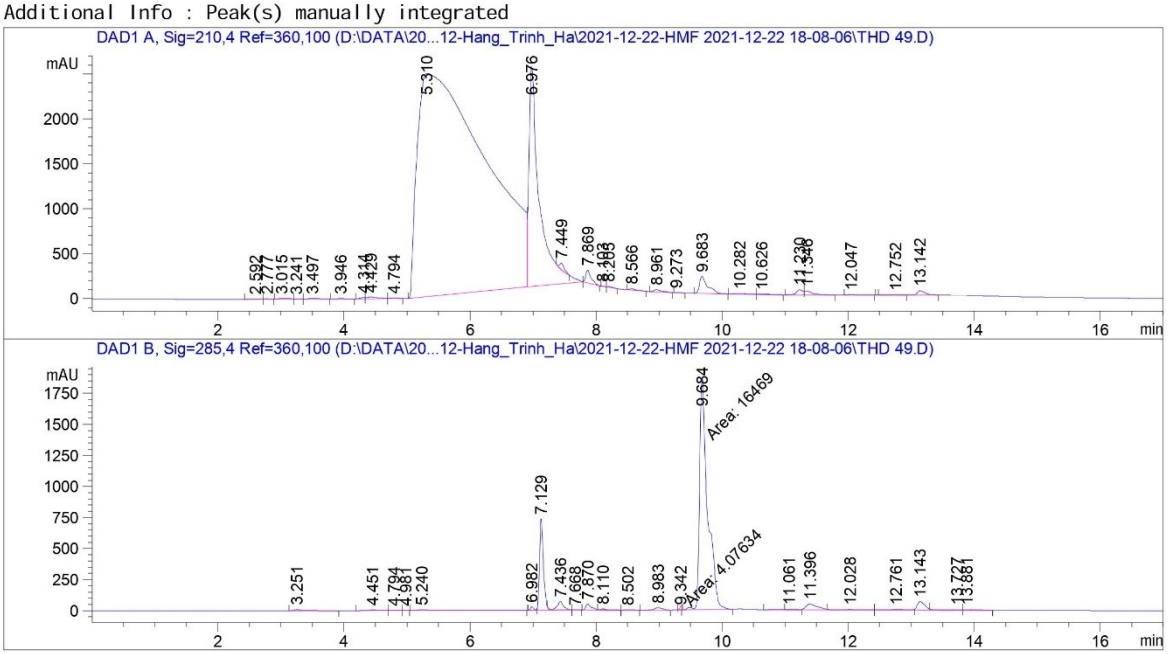


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======================================================================
                    External Standard Report
======================================================================

Sorted By             :      Signal
Calib. Data Modified  :      12/24/2021 12:50:07 PM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.946	BB	54.11307	1.37657	74.49016		Formic acid
8.961	BB	202.83208	3.46093	701.98666		Levulinic acid
9.683	BB	1701.93420	1.22948e-1	209.24898		HMF
10.282	BV	96.59569	3.67382e-2	3.54876		DFF
11.230	BV	416.63748	1.93799e-1	80.74412		FDCA
11.346	VB	366.60788	1.04528e-1	38.32092		Furfural

Fig. S94 First recycling reaction. Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h

Data File D:\DATA\20... 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-06\THD 50.D
Sample Name: THD 50

```
======================================================================
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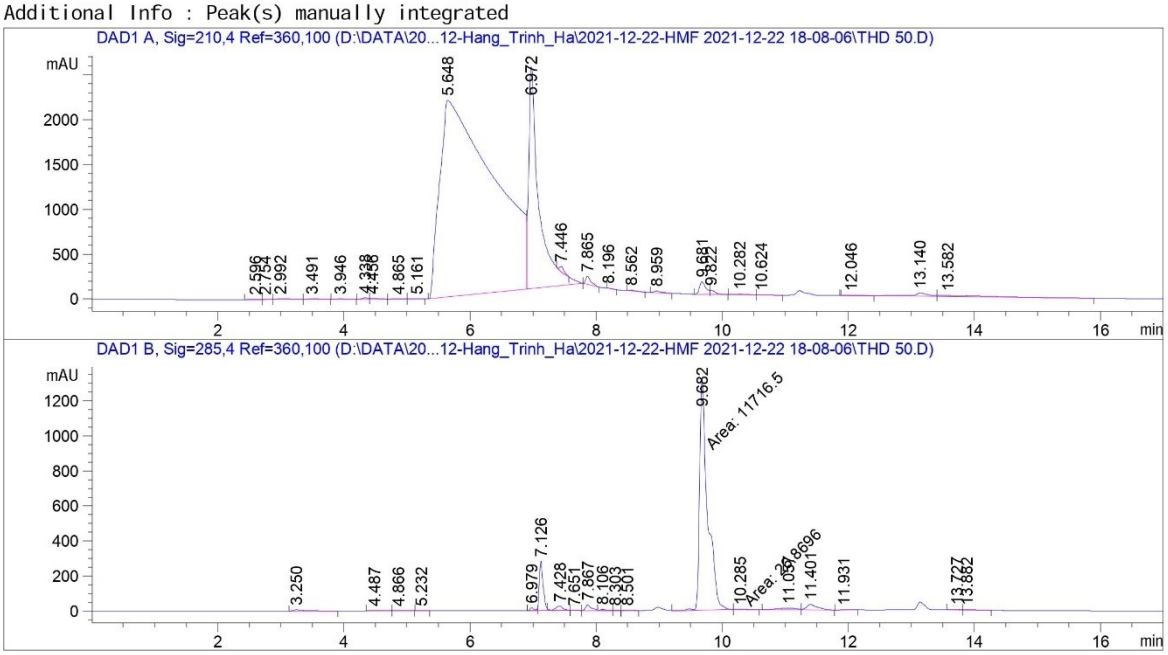
Acq. Instrument : HPLC-DAD                     Location :   P1-D-02
Injection Date  : 12/23/2021 4:42:36 AM              Inj :   1
                                              Inj Volume : 10.000 µl
Acq. Method     : D:\DATA\2021\Thang 12\22-12-Hang_Trinh_Ha\2021-12-22-HMF 2021-12-22 18-08-
                  06\HMF_cot 150_hat nho.M
Last changed    : 11/30/2021 8:55:26 PM by SYSTEM
Analysis Method : D:\METHOD\HMF_cot 150_hat nho_KQ.M
Last changed    : 12/25/2021 8:42:31 AM by SYSTEM
                  (modified after loading)
Additional Info : Peak(s) manually integrated
```

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======================================================================
                    External Standard Report
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Sorted By             :      Signal
Calib. Data Modified  :      12/25/2021 8:45:54 AM
Multiplier            :      1.0000
Dilution              :      1.0000
Do not use Multiplier & Dilution Factor with ISTDs

Signal 1: DAD1 A, Sig=210,4 Ref=360,100
```

RetTime [min]	Type	Area [mAU*s]	Amt/Area	Amount [ppm]	Grp	Name
3.491	VB	97.04059	1.33170	129.22924		Formic acid
8.959	BB	151.47473	3.47029	525.66123		Levulinic acid
9.681	BV	977.57654	1.22337e-1	119.59412		HMF
10.282	BV	98.53720	3.72306e-2	3.66859		DFF
11.000		-	-	-		FDCA
11.300		-	-	-		Furfural

Fig. S95 Second recycling reaction. Reaction conditions: Cellulose (162 mg), C-H_2SO_4 (10 mg), [EMIM]Cl (1 g, 7 mmol), 120 °C, 24 h.